

AMERICAN JOURNAL *of* PHARMACY

SINCE 1825

A Record of the Progress of Pharmacy and the Allied Sciences

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Vol. 98

JANUARY, 1926

No. 1

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Price \$3.00 per Annum in Advance.

Foreign Postage, 25 Cents Extra.

Single Numbers, 30 Cents. Back Numbers, 30 Cents.

Entered as Second-Class Matter at the Post Office at Philadelphia, Pa., Under the Act of March 3, 1879.

Acceptance for Mailing at Special Rate of Postage Provided for in Section 1102, Act of October 3, 1917. Authorized February 11, 1925.

PUBLISHED MONTHLY BY THE

Philadelphia College of Pharmacy and Science

143 North Tenth Street, Philadelphia

American Journal of Pharmacy

ESTABLISHED IN 1825

Four preliminary numbers were published at different times until in 1829, when the publication of the regular volumes began. Since then the publication has been uninterrupted. During the period from 1829 to 1852 four numbers were published annually, except in 1847, when five numbers were published. From 1853 to 1870 six numbers were published. Since this time twelve numbers have been published annually.

MANUSCRIPTS should be sent to the Editor. It should be stated in this connection that the Editor does not assume any responsibility in connection with the views or investigations of contributors, other than to exercise general care in the selection of matter.

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	2 pp.	4 pp.	8 pp.	16 pp.	COVERS WITH TITLES	
25 copies	\$2.25	\$3.75	\$7.75	\$9.00	25 copies	\$1.75
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THE AMERICAN JOURNAL OF PHARMACY

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EDITORIAL

GREETINGS

A HAPPY NEW YEAR TO ALL. There is probably no human greeting so universally and sincerely given as this. For there is a charm left over from the Christmas holidays that lends added spirit to this New Year wish. And indeed one can afford to be both hearty and cosmopolitan at such a season when the new calendar arrives carrying across its every page nothing but charming promises. For the old year is gone leaving our minds and hearts, clean and expectant for the new tenant that comes.

Time, the healing ointment, has eased already all the hurts and aches of yesteryear. Scars are seldom painful. Only the pleasing events of the last year stay in memories. And it is indeed a most beneficent provision that we are suffered to keep our pleasant memories much fresher in mind than painful recollections.

"Fleet is the pain of the rose thorn,
Yet the scent of the flower lives."

But it is not the memories at the close of year that exalt and comfort our hearts—rather it is the joy of Hope, peculiar to the season, that makes us happy. For at no other season does Hope so enter our hearts. Here is a brand New Year, brimful of possibilities and bristling with promises—and here is our chance to freely indulge in that game we so delight in—the gorgeous game of "Expecting."

And singularly enough, even as pleasant memories are ever more lasting than painful recollections, so do we fill this word "Expect" only with indulgent and happy hopes, just as Omar in his Persian garden, underneath the wintry moon, only sang of the rosebuds that came with the Springtime—and never a thought for the thorns.

So we repeat this Happy New Year Greeting to all our readers, and to everybody, everywhere.

With an investment of memories worthwhile and an income of unending hope the New Year can be nothing but happy.

M.F.M.

Having just celebrated its centennial, this JOURNAL faces its second century. Many expressions of good wishes have come to it and the one to whom has been given the delightful privilege of serving as its editor at this happy time now thanks the well-wishers and joins them in hoping for the JOURNAL, **A VERY HAPPY NEW CENTURY.**

IVOR GRIFFITH.

A SUGGESTION FOR ALCOHOL THERAPEUTICS

WHETHER the adoption of the Eighteenth Amendment and the passage of the Volstead Act is for ultimate good or evil, time alone will show, but there is no question that the duties and obligations of physicians and pharmacists have been greatly complicated by the legislation.

The value of alcohol in the treatment of disease has been for many years a matter of dispute. An attempt was made a couple of years ago to ascertain the sentiments of the American medical profession, by a questionnaire distributed by the *Journal of the American Medical Association*. Many thousands of copies were sent, efforts having been made to secure a fairly representative group. About thirty thousand replies were obtained. The paper included questions on the medicinal value of wine and beer, on which points the balance was much in the negative, but concerning whisky, the vote was about "fifty-fifty," to use a familiar expression, with a majority of a few hundred in the affirmative.

Mass statistics must always be taken cautiously. A proper valuation of the figures in this case could only be had by a searching analysis of the individual replies, a very difficult task. It would be necessary to know the circumstances of each physician to determine whether his opinion was really the result of extended observation and comparison, or due more or less to feeling, racial habits or business relations. The regional statistics of the replies showed clearly that in the eastern section of the country and especially in the densely populated districts, the feeling was strongly in favor of the use of alcoholic beverages. This is, indeed, indicated in other ways. The elections show in the states bordering on the Atlantic a very large portion of the inhabitants wholly opposed to prohibition movements, and the police records show that from the highest

to the lowest social status and from the richest to the poorest, a feeling is widely distributed that the restrictive legislation is an outrageous interference with fundamental personal rights.

Whatever may be the final decision on these questions, the most important phase of the problem to the physician and pharmacist is such regulation of the prescribing and dispensing of alcoholic liquids as shall secure the full service of them as remedies and not offer opportunities for mere use as beverages. The questionnaire of the *J. A. M. A.* left the therapeutic value of strong alcoholic liquids (that is, whisky) in doubt. A majority of a few hundred in a total vote of about thirty thousand does not mean much either way, especially when, as above noted, so many personal and business influences are active. Yet it seems impossible that alcohol can have no value in therapeutics. It is a powerful poison, that is, a disturber of function, and all active drugs are of this character. A "dose of salts" acts by disturbing the functions of the intestines; a bitter tonic by disturbing the functions of the stomach. In view, therefore, of the possible value of alcohol, even though so many physicians deny it, it is worth while to inquire whether its therapeutic use might not be wholly separated from its beverage relations. Now, the popularity of alcoholic liquids is largely due to their taste and flavor. While those who use such beverages have usually the purpose of securing their intoxicating action in some degree, they insist on an agreeable form. The current revision of the U. S. P. has restored whisky and brandy to official standing. The main reason for this is that as these liquors are used by many doctors, there should be a standard of quality for each, so that when prescribed under the official name the physician may be sure that the patient will get what is intended.

The proposition submitted in this article is that the doctors and druggists should agree to use as medicine only alcohol as pure as can be obtained by well-known processes, that is, the so-called "silent" or "cologne" spirit, which is free from all but mere traces of accessory ingredients. This might be mixed with a distinctive and not very attractive color and with a marked amount of bitter principle essentially harmless, of course, and as such designated as "medicated alcohol" with appropriate Latin title, abbreviation and rubric. Much detail will have to be worked out to develop such a method, but it seems that social conditions nowadays require some drastic provisions by which the people at large shall be disabused in their view that whisky and brandy are necessary as medicines.

HENRY LEFFMANN.

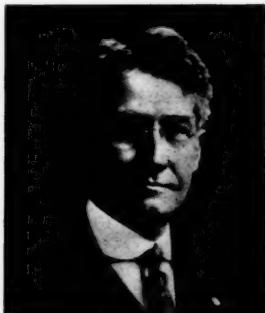
ORIGINAL ARTICLES

THE ROMANCE OF MEDICINES*

By Charles H. LaWall, Ph. M., Sc. D.

"When 'Omer smote 'is bloomin' lyre,
He'd 'eard men sing by land an' sea;
An' what 'e thought 'e might require,
'E went an' took—the same as me!"

THE WORLD'S business affairs are carried on in these times in a cold-blooded, matter-of-fact way, and at a breathless rate of speed. The world's scientific progress is concerned with things intangible, yet real, and is developing along lines that make Jules Verne look like a timid writer with a dearth of imagination and an inferiority complex.



Charles H. LaWall, Ph. M.,
Sc. D.

As a temporary relief from the stress and turmoil of the rapid current of progress one may find solace in the quiet havens of bygone literature. In many easily accessible "quaint and curious volumes of forgotten lore" are found scattered fragments of fact and fiction, of faith and credulity, which the finder may use as warp and woof in weaving a pat-

tern of romance to his liking.

The city of Jena is the starting point of our lecture this evening. Jena is a university town of less than 30,000 population, in the Saxe-Weimar. There are many greater universities than that of Jena. Its manufacturers are of little economic importance. Yet Jena has had a profound influence upon the world's history, and is directly concerned with the romance of medicine.

Its university was founded in 1558 by the sons of John Frederick, the Magnanimous of Saxony. During the period controlled by Duke Charles Augustus, Goethe's patron (1788-1805), it had one of the most brilliant faculties ever assembled in one group, including Fichte, Hegel, Schelling, Schlegel and Schiller. In 1806 it was the scene of Napoleon's decisive defeat of the Prussian army, in which the Prussians were both outnumbered and outgeneraled.

*One of a series of Popular Science Lectures given at the Philadelphia College of Pharmacy and Science, Season 1925-26.

Jena was the first place where optical and laboratory glass were successfully produced, and the influence of these discoveries upon scientific progress can never be adequately appreciated.

Jena is also noted as having been the birthplace and the lifelong home of Ernst Haeckel, the noted biologist, often referred to as the Huxley of Germany. On March 1st, 1837, there was born in Jena a child who was destined to become one of the greatest figures of all who had brought renown to that community. George Moritz Ebers was at first a law student at the University of Göttingen, but during a severe illness which occurred during his student career, he turned to the study of Oriental languages.

A great impetus had been given to the study of Egyptian writings and hieroglyphics by the translation, some years before, of that famous slab of basalt known as the Rosetta Stone. This ancient stele had been discovered by Lieutenant Boussard, one of Bonaparte's engineers, at the time of the Napoleonic occupation of Egypt, and had been acquired by the British Museum, where it lay for years awaiting a translator. Dr. Young, the eminent English physicist, gained the first clew to the solution of the mystery, and he found it to be a trilingual inscription of a decree of the priests of Memphis conferring divine honors upon Ptolemy V, King of Egypt, B. C. 195.

It seems strange to us to realize that an inscription from a date so comparatively recent should baffle translators for so long, for this monument was erected more than a century after the death of Alexander; but we must remember that three great catastrophes had deprived the world of the major portion of its written history and lore. The first of these was when Cæsar's fleet accidentally set fire to Alexandria and burned part of the great Ptolemaic library of more than 400,000 scrolls and papyri which had been accumulated from the time of the foundation of that noted city by Alexander, who had been guided and stimulated by his teacher, Aristotle.

The second was when the Archbishops Theophilus and Cyril instigated the sacking and pillaging of this seat of learning by the Christian zealots of the fifth century. Those who have read Kingsley's *Hypatia* will remember the part that Cyril plays in the brutal murder of the fair Greek scholar.

The third was in the sixth century when Amru, the Arabian conqueror, reported to his commanding officer, the Caliph Omar, that he had captured a city of 4000 palaces, 4000 baths, 400 theatres, and a great library, and wished to know what to do with the volumes

in the latter. Omar's reply has echoed down the centuries as an exemplification of intolerance and bigotry. He said, "If the books agree with the Koran they are unnecessary; if they are contrary to its teachings, they are bad; destroy them." It is stated that the volumes were used as fuel for the public baths and provided heat for more than six months.

Thus it will be seen that pagan, Christian and Moslem each had a share in depriving the world of the accumulated knowledge of the ancients.

Ebers entered upon the subject of Egyptology with enthusiasm, and at the age of thirty-one held the professorship in that subject at the University of Jena. In 1869 he made an exploration tour through Europe and the Near East and upon his return accepted a professorship in the University of Leipzig, which he held until his death.

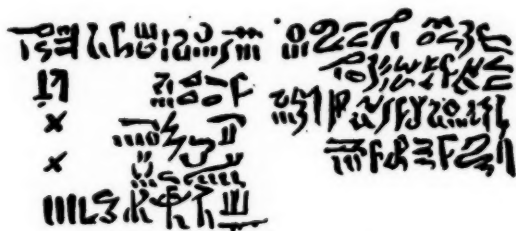
There are several kinds of Oriental savants and archeologists (or official grave robbers, as their fellow faculty members sometimes jokingly call them). Ebers was one of the kind (alas, too rare) who had a keen desire to popularize the knowledge that he had gained through his laborious researches. In 1864 he wrote a novel called "The Egyptian Princess," the scenes and incidents of which were laid in the sixth century B. C. in Egypt and Arabia. In 1877 he followed with what is probably his best known Egyptian novel, "Uarda," which gives a picture of Egypt during the time of Rameses.

In 1872 Professor Ebers was spending the winter in Egypt, making his headquarters in Thebes. An Arab from Luxor, one of the unofficial "grave robbers," came to him with some papyri and relics to sell. The first installment of these was of no value and Ebers did not accept them. The Arab later appeared with a papyrus which he claimed to have discovered fourteen years previously in a mummy case in a Theban tomb. This, in Ebers' opinion, was genuine, and he purchased it and took it back to Germany, where its authenticity was confirmed by other authorities. It was found to be concerned entirely with the medicine and pharmacy of that early period.

This scroll was wrapped in mummy cloth and packed in a metal case. It is of yellow-brown papyrus in a single roll about one foot wide and over sixty feet long. It is divided into over one hundred sections, each separately numbered. The writing is mostly in black ink, with heads of sections and weights and measures written in red. Opposite some of the formulas is the comment "Good," written in

paler ink, probably by some ancient physician-pharmacist who used it as a compounding guide.

This is the celebrated "Papyrus Ebers," one of the most ancient medico-pharmaceutical manuscripts on record. It dates from about 1552 B. C., which is about the time that Moses was tending the flocks of Jethro the Midianite on the edge of the Lybian Desert. There is one older medical papyrus, the Edwin Smith Papyrus, which is said to antedate that of Ebers by about 100 years, but concerning which little has been published.



A Prescription from Ebers Papyrus.

It may be of interest, in passing, to note that one of the oldest papyri extant, is known as the "Papyrus Prisse," named after its discoverer, who also procured it at Thebes and deposited it at the National Library at Paris. The Papyrus Prisse is about 300 years older than the Papyrus Ebers, dating from about the time when Abraham was about to offer up his son Isaac as a sacrifice. Its subject matter is not medical, but it is concerned with a complaint and a warning about the degeneracy of the manners and the decadence of man in comparison with the good old times of former generations! *O tempora, O mores.*

The Ebers Papyrus is claimed by some scholars to be one of the missing six books of Thoth, who is better known as Hermes Trismegistus, the reputed Father of Alchemy. To Hermes the Egyptians ascribed forty-two books, six of which were upon medical subjects, and one of these six was upon pharmacy and materia medica. (This may be the Papyrus Ebers.) The Egyptian physician had to memorize these six medical books of Thoth. If he followed explicitly the rules and prescriptions given therein, he was held blameless if the patient died, but if the physician was found to have deviated from the official procedure, he was put to death.

Some of this lore was attributed to Hermes and some to Enoch, the patriarch "who walked with God and was not." It will be remembered, too, that Alexander the Great is reputed to have discovered the tomb of Hermes with all its treasures, and especially an emerald tablet upon which was graven great chemical secrets. Thoth or Hermes is supposed to have been the teacher of Osiris and Isis, who in turn were the instructors of Aesculapius in the healing art.

We have started at Jena in the last century, and annihilating both time and space, find ourselves in ancient Egypt of 3500 years ago. When we consider the facts obtained from this document of a bygone age, we are amazed at the advanced state of the pharmacy and medicine at that time. More than 700 drugs are named, many of which are identical with the drugs used in the prescriptions of modern medical practice. One difficulty which the translator of these ancient writings encounters is that of identifying the substances which are mentioned, for many of them were represented by symbolical names, a good number of which have never been recognized as applying to modern substances. Thus the "Plant of Osiris" was the ivy; "Tears of Isis" has been identified as vervain; the "Blood of Thoth" was saffron; the "Eye of Typhon" was squill; the "Blood of Isis" was the juice of the dill plant, and the seeds of the same plant were called the "Hair of Kynocephalus"; wormwood was called the "Heart of Bubastis." It is of importance to remember that no concentrated preparations such as fluid extracts or tinctures, such as the modern pharmacist uses, with alcohol as a solvent, had yet appeared, for the art of distillation did not develop until the Arabian period two thousand years later. The solvents other than water which were used in preparing liquid remedies were wine, beer, oil, and vinegar. Among the more important of the vegetable drugs were aloes, anise, castor oil, calamus, cumin, caraway, coriander, colchicum, cedar, dates, dill, elderberries, figs, frankincense, fennel, gentian, grapes, henbane, honey, juniper berries, lotus flowers, linseed, mandragora, mastic, myrrh, opium, onions, peppermint, poppy, saffron, squill, storax, and wormwood.

The mineral substances, mainly used externally, were precious stones, iron, lead, magnesia, nitre, vermilion, blue vitriol, white lead, salt and crude sodium carbonate.

The animal drugs were represented in part by asses' hoofs, animal fats from various sources, goose grease, lizards' blood, swine's teeth,

putrid meat, moisture from pigs' ears, milk, and excreta of man and many animals, even of flies.

Can you imagine the apothecary of today collecting flyspecks to compound a prescription? Shades of Ammon Ra and other ancient deities, preserve us! This drug was used as an infant anodyne, and was compounded with the seeds of an unidentifiable plant to produce the prototype of the remedy that "babies cry for."

Some of the prescriptions of the Ebers Papyrus were fairly simple. As purges, there were recommended a combination of milk, yeast, and honey, or pills compounded of honey, wormwood, and onion. From the mildness of these we are impelled to the conclusion that the ancient Egyptians were not victims of chronic constipation. In this connection we are reminded of the fact that the Egyptians of that time believed that most illness was caused by overeating, and three days in each month were devoting to fasting and purging, in order to counteract the ill effects of traveling through life by the "gorge route."

For headache, there was a prescription calling for frankincense, cumin, u'an berries (unidentifiable), and goose grease, to be boiled together and applied externally. Again the impelling thought—were there no real "Katzenjammers" in the days of King Tut? One headache remedy which was used for noble patients, and attributed to divine origin, Isis having prescribed it for Ra's headache, contained coriander, wormwood, juniper, honey, and opium. This would probably be effective—permanently so, if enough were taken. Another vagrant thought—were headaches the prerogative of the gods and the nobility?

As a prescription for a tonic, there was recommended a preparation made by compounding figs, Assyrian plums, grapes, frankincense, cumin, wine, beer, yeast, and goose grease. If we were to leave out the goose grease, and mix the remaining ingredients in such a way as to allow certain natural changes to take place, this tonic might even be popular at the present time.

A prescription, annotated as having been prepared for Schesch (a queen of the third dynasty) consisted of equal parts of the heel of an Abyssinian greyhound, date blossoms, and asses' hoofs, all boiled together in oil. This was for the purpose of making the hair grow. We wonder if Cleopatra used this as part of her campaign for the hearts of her Roman callers.

A remedy for baldness was prepared from a mixture of the fat of the horse, the crocodile, the cat, the snake, and the ibex. The large number of bald men today is probably accounted for by their inability to procure this remedy.

The ancient Egyptian apothecary must have carried a full line of vermifuges, for the Ebers scroll contains formulas for remedies against hookworms, tapeworms, seatworms, and intestinal worms.

The pharmacists of the time of Rameses were called upon to supply infusions, decoctions, confections, inhalations, insufflations, gargles, injections, pills, powders, triturations, salves, plasters, and poultices. They performed the operations of weighing, measuring, macerating, filtering and straining.

A perfume called Kyphi, made in the times of the Pharaohs, from juniper berries, myrrh, frankincense, cypress wood, aloes wood, calamus, mastic, and storax, was handed down through the writings of Dioscorides to later times, and was used in religious observances within comparatively recent times in Europe.

Polypharmacy, or the prescribing of numerous drugs in the same prescription or preparation, probably had its inception in periods far remote even from that in which the Ebers Papyrus was written. One poultice contained thirty-five ingredients; other prescriptions contained nearly as many. This procedure, which was founded on a belief that a drug gained in power when prescribed in combination, instead of being merely diluted in its effect, had an influence on the practice of medicine, and the compound preparations of pharmacy, which reached its zenith of popularity between two and three hundred years ago, and has not yet entirely disappeared from medical practice.

Some of the pharmaceutical procedures were very complicated, as illustrated by a remedy for stomach trouble. Several seeds and herbs were first directed to be pulverized and mixed together. Then seven stones were to be heated over a fire. When the stones had become hot the powder was to be sprinkled on each one in turn. The stones and smouldering powder were then to be covered with an inverted pot with a small hole in the bottom. To this hole a hollow reed was attached and the vapor was to be inhaled by the patient.

The question as to whether the gods and goddesses of the early Egyptians, and even later, of the Greeks and Romans, were purely mythical or whether the myths that had developed about them were based upon real persons originally, has puzzled many historians.

Cicero, the noted Roman statesman of the first century, whose opinion is certainly worth something, gave credence to the latter view in the statement that "it was a well established custom among the ancients to deify those who had rendered to their fellow men important services, as Hercules, Castor and Pollux, Aesculapius, Bacchus, and many others had done." Apropos of this subject, several interesting inscriptions have been found engraved upon two columns discovered in the City of Nyoa, Arabia. They refer to Osiris and Isis, the reputed founders of medicine and pharmacy. On the first column is this: "My father is Cronos, the youngest of all the gods. I am King Osiris, who have visited with my armies every country on the face of the earth—the remotest inhabitable parts of India, the regions lying beneath the Bear, the neighborhood of the shores of the Danube, and the shores of the ocean. I am the eldest son of Cronos, the scion of a fine and noble race. I am related to the day. There is no part of the earth that I have not visited, and I have filled the entire universe with my benefits."

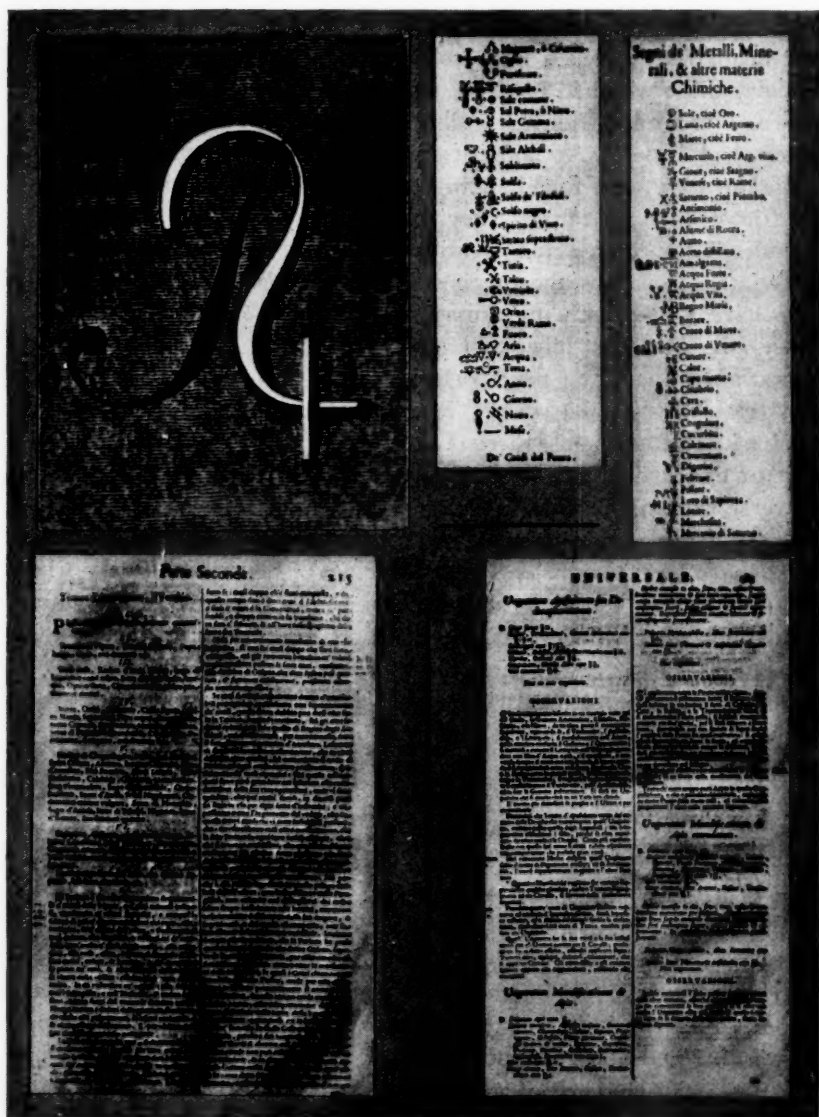
On the second column: "I am Isis, Queen of all this country, and I have been taught by Thoth (Hermes). There is nobody who has the power to loosen what I shall bind. I am the oldest daughter of Cronos, the youngest of the gods. I am the wife and at the same time the sister of King Osiris. To me is due the credit of having been the first to teach men agriculture. I am the mother of King Horus. I shine in the Dog Star. It is I who built the City of Bubastis. Farewell, Egypt, my native land."

Bubastis was a Nile city, the holy city of the Egyptian goddess Bast, whose sacred animal was the cat.

Isis has been identified with Io of the Greeks, with the goddess Mut of Thebes, and Sekhet of Bubastis. She has been called Hathor by the Egyptians, Aphrodite by the Greeks, and Astoreth by the Babylonians. All that was good and beautiful among men was believed to come from her; she watched over the birth of children and rocked the cradle of the Nile. As the goddess Neit she was the originator of weaving and other feminine arts.

The prescriptions of the Ebers and other ancient Egyptian papyri were usually to be accompanied with invocations or prayers. Sometimes these invocations were to be repeated by the compounder when preparing the medicine. One of these is as follows:

"As it shall be a thousand times. This is the book of healing of all sicknesses. That Isis may make free, make free. May Isis



1. Prescription Signature from Paris Pharmacologia (Published a century ago).
- 2 and 3. Symbols from Seventeenth Century Pharmacopœia.
4. Formula for Theriac from a Seventeenth Century Pharmacopœia.
5. Page from a Seventeenth Century Pharmacopœia, showing astrological sign of Jupiter preceding all prescriptions.

heal me as she healed Horus of all pains which his brother Set had done to him who killed his father Osiris. Oh, Isis, thou great magician, heal me and save me from all wicked, frightful, and red things, from demoniac and deadly diseases and illnesses of every kind. Oh, Ra. Oh, Osiris."

The following form was to be used by the patient when taking a remedy: "Come remedy, come drive it out of this my heart, out of these my limbs; oh, strong magic power with the remedy."

We find invocations and prayers used as adjuncts to the practice of medicine even down to the present time. One celebrated liniment of a few hundred years ago was directed to be applied with the accompaniment of certain psalms or prayers. These, however, had been selected so as to control the time of the rubbing within certain specified limits, to ensure uniformity and thoroughness of effect.

It will surprise many who have not studied the history of symbolism in pharmacy and chemistry to learn that the abbreviation "R" placed at the head of prescriptions, and which is in part an abbreviation of the Latin mandatory word "*Recipe*" (take thou of), is also in part an invocation to Jupiter. Illustrations from ancient books confirm this undoubted association.

According to Dr. Otto A. Wall, who made a comprehensive study of this subject, the astrological sign was introduced into medicine by the physician Krinas during the reign of Nero in the time of the fiercest persecutions of the Christians, and it was probably used by physicians to indicate their conformity with the State religion, for during Nero's time Christians were forbidden to practice medicine, and as late as the fourth century, in the reign of Julian, no Christian teacher was tolerated in the medical schools.

It is interesting, in this connection, to know that the word "crucible" derives its name from the *crux* or cross with which the pious alchemists of the monastery laboratories of the later Christian era marked the vessel in which they heated substances to a high temperature. Indeed the symbolism of pharmacy constitutes one of its most fascinating and little studied chapters, and illustrations are given from two sixteenth century works showing the extensiveness with which symbols were used.

The materia medica and pharmacy of the Egyptians, upon which we have spent considerable time, is in no wise different from the practice of the Mesopotamians, Hindus or Chinese, all of whom have

interesting records of a similar nature. The pharmacy and medicine of the early Greeks was undoubtedly influenced by Egyptian *materia medica* and Babylonian astrology, for according to Virgil's *Aeneid*:

"Next she sprinkles round with feigned Avernian Drops, the hallowed ground;
Culled hoary simples found by Phoebe's light, with brazen sickles reaped at noon of night;
Then mixes baleful juices in a bowl."

In the *Iliad*, Homer refers to Chiron as the originator of pharmacy, in two places. In the first place when Machaeon cures Menelaus:

"Then sucked the blood and sovereign balm infused,
Which Chiron gave and Aesculapius used."

Recipe, \mathcal{R} , \mathcal{R} , \mathcal{R} , \mathcal{Z}
 \mathcal{F}
 Jupiter, \mathcal{J} , \mathcal{J} , \mathcal{J} , \mathcal{U} , \mathcal{G}
 stannum, \mathcal{S} , \mathcal{A} , \mathcal{J} , \mathcal{C} , \mathcal{D} , \mathcal{Z}
 $\mathcal{4}$, $\mathcal{28}$, \mathcal{Z} , \mathcal{H} , \mathcal{U}
 \mathcal{E} , \mathcal{M} , \mathcal{R} , \mathcal{H} , $\mathcal{6}$.

Various Symbols used for Jupiter and also as prescription headings in some cases.

and later where Patroclus treated the wound of Eurypylus and is requested by the latter to

"With lukewarm water wash the gore away,
With healing balms the raging smart allay,
Such as sage Chiron, sire of pharmacy,
Once taught Achilles, and Achilles thee."

Whereupon Patroclus proceeds as follows:

"Then in his hand a bitter root he bruised;
The wound he washed, the styptic juice infused,
The closing flesh that instant ceased to glow,
The wound to torture and the blood to flow."

Chiron, according to the Greeks, instructed Achilles, Jason, Aesculapius, Odysseus and others in the art of using drugs. Chiron,

in turn, had been taught by Apollo and Diana. At Chiron's death he was translated by Jupiter to a position among the constellations and we know him as Saggitarius, the archer.

Other quotations of interest in this connection, from Virgil, are as follows:

Where Hippolytus is restored to life, with the result that Aesculapius was killed by a thunderbolt from Jove:

"But chaste Diana, who his death deplored,
With Aesculapian herbs his life restored;
When Jove who saw from high with just disdain,
The dead inspired with vital breath again,
Struck to the center with his flaming dart,
The unhappy founder of the godlike art."

And also where Aeneas, having been severely wounded, is first treated by Patroclus without avail and is later cured by the unseen art of Venus herself:

"The famed physician tucks his robes around
With ready hand and hastens to the wound.
With gentle touches he performs his art,
This way and that soliciting the dart,
And exercises all his heavenly art.
All softening simples known of sovereign use
He presses out, and pours their noble juice;
These first infused to lenify the pain,
He tugs with pincers, but he tugs in vain.
Then to the patron of his art he prayed;
The patron of his art refused his aid.

But now the goddess Mother, moved with grief,
And pierced with pity, hastens her relief;
A branch of healing dittany she brought,
Which in the Cretan fields with care she sought;
Rough is the stem, which woolly leaves surround,
The leaves with flowers, the flowers with purple crowned,
Well known to wounded goats, a sure relief
To draw the pointed steel and ease the grief.
This Venus brings in clouds involved, and brews
The extracted liquor with ambrosian dews;
And odorous panacea; unseen she stands
Tempering the mixture with her heavenly hands,
And pours it in a bowl already crowned
With juice of medicinal herbs prepared to bathe the wound.

The leech, unknowing of superior art,
With this foment the part, which aids the cure,
And in a moment ceased the raging smart;
Stanch'd is the blood, and in the bottom stands;
The steel, but scarcely touched with tender hands
Moves up and follows of its own accord,
And health and vigor are at once restored."

The question of who wrote the first prescription, or who compounded it, can never be definitely decided. The first prescriber was probably the first compounder as well, for medicine and pharmacy are coeval, and their historical development has been practically synonymous until within the past few hundred years, which constitutes but an insignificant fraction of their joint recorded history. The oldest prescription on record is one on exhibition in the Egyptian Collection at the Metropolitan Museum in New York. It is for a throat affection, and is written on stone, in ink by the use of a brush. It was unusual for the Egyptians to write upon stone in this manner, but we are informed by one of the authorities who has studied it, that this was probably a copy of a prescription given to the patient to be carried with him on a journey.

The Babylonian records are all written upon clay tablets in the cuneiform or wedge-shaped characters. The ancient records of Babylonia, India, and Persia, are much like those of Egypt in regard to the practice of medicine and pharmacy. It would be about as difficult for a modern pharmacist to compound one of the ancient Egyptian or Babylonian recipes as it would be for an ancient Egyptian apothecary to compound a prescription written by a modern physician.

What are the oldest compounded medicines that have come down to us out of the past? Probably the best known of these is no longer used exclusively as a medicine, although its Roman originator had great faith in its remedial properties. It is the Rosewater Ointment of the Pharmacopœia, better known to the public as "cold cream." The formula for this was proposed by Galen, commonly called Claudius Galen, although he does not appear to have had a first or given name until the time of the Italian renaissance, about fourteen centuries after his death in the second century A. D. Galen probably evolved this preparation while in charge of the health of the gladiators, for he was the official physician to these athletic contestants for many years.

Although Galen, who was a great physician-pharmacist of his time, wrote many books and described many drugs and their prepara-

tion, this is the only one of the latter class that has come down to us practically unchanged.

Another medicinal preparation, less known popularly, has had an older continuous history. It is the Powder of Aloes and Canella of the National Formulary, called *Hiera Picra*, which literally translated means "sacred bitters." The earliest formula for this dates from about 500 B. C., and was recorded by Themison of Laodicea, a physician-pharmacist who practiced in Rome at about that period. The word "Hiera" was used generically to describe a number of variants of a formula which usually contained aloes as the dominant ingredient, modified or disguised with aromatics. These Hieras were originated by physicians who used and sold them as secret nostrums, without divulging their composition.

One of the most noted of these was the Hiera originated by Antonius Pachius shortly after the beginning of the Christian Era. It had such a vogue and acquired such a reputation that it is related by Scribonius Largus, physician to the Emperor Tiberius, that large sums of money were offered to the originator of the formula.

Pachius kept his formula a secret until his death, after which the Emperor had his effects seized and his library searched to see if the recipe could be found. It was finally discovered in a manuscript which Pachius had dedicated to the Emperor himself. Tiberius handed the formula to Scribonius with instructions that it be published and preserved. It was found to contain colocynth or bitter apple in place of the commonly used aloes.

Other Hieras which appeared during the succeeding centuries were those of Logadius, of Archigenes, of Theodoretus, of Galen, of Alexander, of Tralles, of Rufus, of Justus, of Mesue, of Hermes, of Rhazes, and of Constantine. Many of these were originally introduced as panaceas, or cure-alls, administered for every ill, from leprosy to chronic constipation. The Arabs made one into pills which were used against the plague, and were known as *Pilulae Pestilenciales* in the tenth century A. D. In the early editions of the *Edinburgh Pharmacopœia* in the seventeenth century, these pills were known as *Pilulae Communis* (common pills), and were the forerunners of the present day compound cathartic pills.

The present official *Hiera Picra* is very much simplified in form, but we find that true of many of the older medicines, the name having been retained in many cases for preparations which contain but a small fraction of the original number of ingredients.

We must take the time to discuss briefly the use of the earths in medicine, although they are not prepared medicines but are materials of natural origin. The most noted of these is *Terra Sigillata*, which, literally translated, means "the earth whose authenticity is established by a seal." There were many earths described by Dioscorides, which were reputed to have different properties, according to their origin. These earths were natural forms of clays, of absorbent properties similar to kaolin and other clays recognized by the pharmacopœias of today. Galen describes with much detail the preparation of the earth as carried out in the island of Lemnos in the first century A. D. The earth was dug with great ceremony on one particular day of the year only. The pit, which had been kept closed and guarded during the remainder of the year, was opened with solemn rites by the priests on the 6th day of August, six hours after sunrise. A quantity of the earth was taken out, estimated to meet the needs of the year. It was carefully washed, dried and then molded into small blocks, each of which was imprinted with the seal of the Grand Signior and sent to Constantinople for distribution. The earth was for centuries the monopoly of the Sultan of Turkey, and the penalty of death was attached to opening the pit on any other than the appointed day. At one time it was said that the figure of Artemis or her symbol, the goat, appeared upon the tablets, and this led to the belief that the earth was compounded with goat's blood during its preparation. Galen contradicts this statement in his account of the subject.

Other "sealed" earths were known besides that coming from Lemnos. *Terra Mellitea* came from Malta and was used especially for the bites of serpents. This earth bore the effigy of St. Paul on each tablet, as St. Paul was credited with having blessed the earth of this island upon landing there. *Terra Portugallica* came from Portugal and was stamped with the figure of a rose. *Terra Germanica* or *Terra Strigensis*, from Strigonium in Hungary, bore a design of mountain peaks and crosskeys. The Lemnian earth later bore Arabic (Turkish) designs.

Dr. Herman Schelenz, the eminent German historian of pharmacy, states that the imprints on these various forms of *Terra Sigillata* were the earliest form of trademark and that the trademark really originated from this source.

Terra Sigillata was most highly esteemed as an antidote for poisons. Several curious records of trials of its efficacy were discovered among some sixteenth century German archives. In one of

these experiments were made upon dogs, and in the other upon a condemned criminal, whose life was spared after a deadly potion had been given him in connection with this antidote. The accused took a drachm and a half of corrosive sublimate mixed with conserve of roses, followed by a drachm of Terra Sigillata Germanica, in old wine. Although the prisoner was made very ill, he eventually recovered and was set free.

One of the most important factors in the development of the many complex medicines which are noteworthy in the pharmaceutical literature of the early Roman period and the pharmacopœias of the fifteenth, sixteenth and seventeenth centuries, was the quest for a universal antidote, alexiteric, or alexipharmic, from *alexion*, to repulse, and *theria*, a wild beast, or *pharmakon*, a poison. The most noted of these and the prototype of many of its class was the *Confectio Mithridate* of the first century B. C.

It will be remembered by many that Mithridates VI, King of Pontus, lived in such deadly apprehension of being poisoned, that he experimented not only upon condemned criminals in his realm, but took poisons and antidotes himself so frequently that he developed a degree of immunity which was his own undoing. He was defeated by Pompey, and in order to avoid falling into the hands of his conqueror, Mithridates attempted to commit suicide by taking poison. Either he had taken an insufficient quantity or he had developed immunity to that particular poison, for he had to command one of his attendants to kill him with his sword. Pompey searched Mithridates' palace and personal effects for the formula for this celebrated antidote. The formula, which was handed down for many centuries, probably originated with Andromachus, Nero's physician, for the formula said to have been found by Nero consisted of "20 leaves of rue, a pinch of salt, two nuts, and two dried figs."

Even the most credulous could hardly have faith in a medicine of such simplicity, so the formula as ordinarily credited to Mithridates contained fifty-four ingredients, and Andromachus himself made certain changes and supposed improvements, as did numerous other subsequent physicians, so the literature from the beginning of the Christian Era to the eighteenth century is full of references to this class of preparations. They were called *Theriaca* or Theriacs, a name originated by Nicander of Colophon in the early part of the second century B. C., from the Greek *Theria*, a venomous beast. He wrote two works in verse—one on *Theriaca*, which deals with

the bites of venomous animals, and one on Alexipharmics, which treats of poisonous substances swallowed. These two terms were kept distinct by Dioscorides, Galen, Avicenna, and other medical writers, but in later times came to be considered more or less synonymously.

According to Pliny and corroborated by Galen, the formula for the first theriac was inscribed in verse on stone in the temple of Asklepios on the island of Cos, the birthplace of Hippocrates. Formulas for theriacs passed into many of the early European pharmacopœias. An illustration of such a formula, occupying almost an entire page of a folio volume, is taken from the *Teatro Farmaceutico* of Donizelli, published in 1677. The one attributed to Andromachus probably eclipsed all of the others in fame and popularity for many centuries. This theriac contained as its most notable and rare ingredient "the flesh of vipers," which is found in some formulas down to the eighteenth century.

Another theriac of wide popularity was that of Philon of Tarsus, who recorded his formula in Greek verse. This practice of giving formulas in metrical cadence was not for the esthetic or literary effect, but to make them easier to memorize and to ensure fidelity in transcribing, for we must remember there were no printed books in those days, only oral traditions and manuscripts.

Galen also speaks highly of this one. One of its ingredients was "the red hair of a lad whose blood had been shed on the fields of mercury," and it contained many other drugs whose names are disguised in mystic language. The mixture was directed to be made into a conserve with the "product of the daughters of the Bull of Athens," which meant Attic honey. The Theriaca Philonium survived nearly eighteen centuries and in a much simplified form was found in the London Pharmacopœia of 1746.

The several theriacs had different properties, according to different authors. That of Philon was originally intended as a remedy for a peculiar form of colic which became epidemic in Rome during the time of Philon's practice. Another famous theriac, which was originally also published in metrical form, was that of Democrates, physician to Tiberius, who also invented formulas, famous in their day, for dentifrices, poultices, liniments, and plasters.

In the middle ages, the theriacs or "treacles," as they were sometimes called, brought reputation to certain communities where they were prepared under the supervision of qualified physicians and phar-

macists and with great pomp and ceremony. From the fourteenth to the seventeenth century theriac was regarded as a specific against the plague and was in great and universal demand throughout Europe. In Bologna the mixing of the theriac was conducted publicly in the courtyard of the city hall and in the presence of the city officials. The Theriac of Venice or Venice Treacle long had the supremacy over the theriacs made by the rival cities of Constantinople, Cairo, Genoa, Florence, and Bologna. It contained sixty-one ingredients and was also the subject of much pomp and ceremony. John Evelyn, an early English writer, whose memoirs are almost as celebrated as the diary of his contemporary, Pepys, states in connection with a visit to Venice: "Having packed up my purchases of books, pictures, casts, treacle (the making and extraordinary ceremony whereof I had been curious to observe, for it is extremely pompous and worth seeing), I departed from Venice."

In Queen Elizabeth's reign the English apothecaries had been making Theriac of their own which was claimed to be superior to the imported product. Some controversy had evidently occurred, for a pamphlet was issued by Hugh Morgan, Apothecary to the Queen (1585), in which the author emphatically states that his product has been compared with other "theriacle" brought from Constantinople and Venice, and has been commended. He goes on to say petulantly: "It is very lamentable to consider that strangers do dayly send into England a false and naughty kind of Mithridatum and Threacle in great barrells more than a thousand weight in a year and utter the same at a low price for 3 pence and 4 pence a pound to the great hurt of Her Majesties subjects and no small gain to the strangers purses."

In the previous century (1591) Cairo had the reputation for the finest theriac. Prosper Alpinus, a physician of Padua, who resided three years in Cairo, gives a graphic account of the ceremony of its preparation in that city. This ceremony occurred annually in May in the Mosque of Moreston, under the supervision of the city's chief pharmacist in the presence of all the physicians. At that time purchasers from every country in Europe visited Cairo for their supplies of theriac. "Tyriaca," as he called it, was one of the drugs recommended by Helias the Patriarch of Jerusalem to Alfred the Great in the ninth century.

A celebrated theriac of the seventeenth century was the one invented by Sir Walter Raleigh while undergoing twelve years' impris-

onment in the tower during the reign of James I. It consisted of forty roots, seeds, herbs, barks, and woods, macerated in alcohol, distilled, and the distillate subsequently combined with a great variety of mineral and animal ingredients. It was known as Raleigh's Cordial. This combination was official in the London Pharmacopœia under the name "Confectio Raleighana." Later the name was changed to "Confectio Cardiaca," and the formula was somewhat simplified. Still later it was further simplified and the name changed to "Confectio Aromatica." A remnant of these former preparations still remains in the pharmacopœias of our time under the name of Aromatic Chalk Powder. Such are the vicissitudes and changes that the names and formulas of medicines undergo during the passing years.

What is the consensus of opinion of modern physicians about this noted preparation, which retained its position as a valuable remedy for nearly 2000 years and which has no counterpart in modern medicine?

Those who have studied the formulas as recorded report that the best that can be said of them is that the balsamic constituents might have a slight antiseptic effect upon the alimentary tract, but that the preparation could have no real remedial value in any but imaginary afflictions, and certainly no antidotal value in case of poisoning. In this respect it differs from the Terra Sigillata which, according to modern scientific views, possesses real antidotal power in connection with certain classes of poisons. It is quite probable that the real popularity of the theriacs, and possibly some of the reputed therapeutic value, was due to the fact that they were usually taken with wine.

One of the most curious chapters in the Romance of Medicines is that connected with the use of what were called "sympathetic remedies." These constituted a form of absent treatment for wounds, which was so different from the unscientific and often insanitary methods of treatment, even up to the time of Pasteur and Lister, that there is little wonder at the esteem in which they are held, although we may indulge in a smile at the curious hypotheses which were published to account for their efficacy. The treatment, in brief, was this:

The wound itself received no treatment except washing in clean, cold water, and bandaging with clean linen; the bandage was not to be removed for some days. The remedy was applied to the weapon which had caused the wound. It is important to note that the treat-

ment would not answer if an artery had been severed, or if the brain, heart, or other internal organs had been injured. Paracelsus was the author of one of these sympathetic remedies which was in the form of an ointment. His theory of the treatment was that the anointment of the weapon acted upon the wound by a magnetic current through the air to the healing balsam. This preparation came to be known as the Paracelsan Weapon Salve, or Unguentum Armarum.

Van Helmont, Descartes, and Batista Porta are among the prominent men, as late as the seventeenth century, who espoused the theory of this treatment. Van Helmont even wrote a book on the subject in which he insisted that the "moss from a dead man's skull," called by the Latin name of "Usnea," which was one of the important ingredients in the Paracelsan formula, must be obtained from an individual whose surname contained only three letters—surely a most difficult requirement.

Another "sympathetic" preparation, which was in the form of a powder, was that of Sir Kenelm Digby. He was an unusual character of the seventeenth century, the son of one of the leaders of the Gunpowder Plot, who seems to have lived down the stigma of his father's execution. He was very popular with King James I, whom he pressed for a commission to wage war against the Spaniards and capture some of their rich galleons. The Lord High Admiral, whose signature was needed to make such a commission legal, being absent when Sir Kenelm was ready to sail, he was granted a "license to undertake a voyage for the increase of his knowledge." He evidently started in with the idea of completing a post graduate course as well, for he spent several years in the Mediterranean capturing French, Spanish, and Flemish ships, and finally defeated the combined fleets of the French and Venetians at Scanderoon in Asia Minor north of Antioch, after which he returned to England, was knighted, changed his religion several times, was imprisoned and banished at intervals, during all of which period he devoted himself to science, and finally published a book on what he called the "Sympathetic Powder," which consisted of powdered copperas, or green vitriol. His explanation of the effect of the powder was that "the rays of the sun extracted from the blood and the vitriol associated with it, the spirit of each in minute atoms. These combined, and the air charged with the atoms of blood and vitriol were attracted to the wound and effected the cure."

An example of one of the cases is interesting, as quoted from Wootten's *Chronicles of Pharmacy*. A carpenter had cut himself severely with an axe. The offending axe, still bespattered with blood, was treated with the remedy and hung up in a cupboard. The wound progressed satisfactorily, but one day it suddenly became violently painful. On investigation it was found that the axe had fallen from the nail upon which it had been hung.

In the National Portrait Gallery, Sir Kenelm Digby's portrait has attached to it a plate on which is inscribed the statement that he was "a prodigy of learning, credulity, valor and romance." He must have been a compelling character, for one of his contemporaries pays him the unusual tribute of saying, "He was such a goodly person, gigantic, and of great voice and had so graceful elocution and noble address, that had he been dropt out of the clowdes in any part of the world he would have made himself respected."

In *Hudibras* are several references to the "sympathetic powder":

"For by his side a pouch he wore
Replete with strange hermetic powder,
That wounds nine miles point blank would solder
By skilful chemist at great cost
Extracted from a rotten post."

And

"'Tis true a scorpion's oil is said
To cure the wounds the vermin made;
And weapons dressed with salves restore,
And heal the wounds they made before."

Sir Walter Scott also alludes to this remedy in the *Lay of the Last Minstrel* in the following lines:

"But she has ta'en the broken lance,
And washed it from the clotted gore,
And salved the splinter o'er and o'er."

One of the least important of modern remedies and yet one that has had a history as romantic as any is the *Acetum Aromaticum* or *Aromatic Vinegar* of the *National Formulary*, which consists of the oils of lavender, rosemary, juniper, peppermint, cinnamon, lemon, and clove, in a mixture of acetic acid, alcohol, and water. This is now used as a refreshing application in headache or a stimulating inhalant in cases of faintness.

This is not a very ancient preparation, for we find no references to it in a number of comprehensive pharmacopœas of the seventeenth

century. It is said that the first use of such a combination of ingredients was by Cardinal Wolsey several centuries before, who in times of epidemic was accustomed to carry an orange deprived of its pulp and filled with absorbent material saturated with vinegar and spices, to counteract the supposed effluvia of the plague.

This Aromatic Vinegar was, however, a popular preparation about 135 years ago. Its popularity grew out of the fact that it was reported to have been used as a prophylactic against the plague by four robbers of Marseilles, who saturated handkerchiefs with it and tied them over the mouth and nose while pursuing their nefarious practice of robbing the dead and dying during an epidemic in that city. Its reputation in this respect gave it the characteristic synonym "*vinaigre des quatre voleurs*" (vinegar of the four thieves), and during the plague epidemic which afflicted Philadelphia in 1793, so effectively described by Charles Brockden Brown, the first American novelist, in "*Arthur Mervyn*," his first book, and later by the famous physician-author, S. Weir Mitchell, in "*Hugh Wynne, Free Quaker*," it was advertised extensively by druggists of the Quaker City. One of these early advertisements reads as follows: "By appointment, the genuine *Vinaigre des quatres voleurs*, or *Vinegar of the Four Thieves*. Celebrated particularly among the French, as one of the *Best Preventatives for Infectious Disorders*, is sold by Philip Sonnenkamp, Druggist, No. 4 S. High Street. Note. If any purchaser of a bottle by keeping it no longer than 24 hours, should think by strict enquiry of judges, that it is neither genuine, nor made agreeable to the original receipt, shall have the money returned to the bearer of the bottle."

Another advertisement goes into greater detail as follows:

"*For Preventing Infectious Disorders, Essence and Salt of Vinegar*, or the *Celebrated Vinegar of the Four Thieves*. This elegant preparation is formed of concentrated vinegar, impregnated with the most efficacious antiseptics and aromatics, which renders it particularly useful in nervous headaches, faintings, lowness of spirits, etc. Its effluvia is extremely grateful and pungent, and is happily adapted to stop the progress of infections, disorders and, as such, should ever be the companion of those who visit or attend the sick."

"It is said that during the dreadful plague at Marseilles, four persons, by the use of this essence or salt as a preservative, attended unhurt, multitudes of those who were infected, and that under colour of these services, they robbed the sick and the dead, and that one of them, being afterwards apprehended, saved himself from the gallows

by discovering the secret. The preparation was hence called *Vinaigre des quatre voleurs* or *The Vinegar of the Four Thieves*. For sale only by Goldthwait and Baldwin, the corner of Second and Walnut Street and John White, Druggist and Chemist in Market Street."

Almost everybody knows what a Seidlitz Powder is, and how the contents of the blue paper and the white paper, when separately dissolved in water and mixed at the time of taking, provide a pleasant, effervescent, aperient draught. The active constituent in this preparation is a laxative saline remedy known as Rochelle Salt, which was accidentally discovered by Peter Seignette, an apothecary of the French City of Rochelle in 1672. He made it then by essentially the same process that is used today, the mixing of sodium carbonate with cream of tartar, both in solution, and crystallizing the resulting compound. He ascertained that the new compound had laxative properties, and advertised it as a new remedy by handbills, calling it "Sal Polychrestum," or the salt of many virtues, each dose of Sal Polychrestum enclosed in an envelope and bearing a picture of a goose.

We can hardly appreciate in these days of the popularity of preparations of mineral oil and of cascara, the esteem in which new saline cathartics were held at that time. Johann Rudolph Glauber, the celebrated German chemist who served as a connecting link in the previous century between alchemy and chemistry, discovered the saline cathartic sodium sulphate, named it "Sal Mirabilis," or the wonderful salt, and heralded it as a panacea for almost all human ills.

The son of Peter Seignette succeeded to his father's business and continued to vend Sal Polychrestum as a secret nostrum. Many unsuccessful attempts were made by pharmacists applying the crude analytical chemistry of that day to identify the substance, but it remained a secret until 1731, when Boulduc and Geoffrey, noted pharmacists of Paris, solved the problem and published the results of their investigations. The importance of the subject at that time will be appreciated when we learn that Seignette's original product had been described in a paper published in the Transactions of the Paris Academy of Sciences, and that the exposure nearly sixty years later was published, not only by the Paris Academy of Sciences, but also in the Philosophical Transactions of the Royal Society of London.

In 1724 Friedrich Hoffman had analyzed the waters of the celebrated Seidlitz Spring of Germany and found the principal constituent to be magnesium sulphate, better known as Epsom Salt, from

the English Spring of that name, which had been already famous in the time of Queen Elizabeth, together with a small amount of sodium sulphate, the compound which had been discovered by Glauber in another spring in the previous century. The name "Seidlitz Salt" came to be used in European pharmacy and medicine as a designation for magnesium sulphate, a custom which persists even to the present time.

Now, both Epsom Salt (the natural Seidlitz Salt) and Glauber's Salt are extremely and disagreeably bitter, while Seignette's (Rochelle) Salt is comparatively tasteless. In 1815 an Englishman named Thomas Savory was granted a patent in Great Britain for a combination of a salt or powder "possessing the virtues of the medicinal spring of Seidlitz in Germany," which Hoffman had analyzed nearly a century before, and named his product "Seidlitz Powders." Like most originators of patent medicines, Savory did not seem to feel himself bound by any ethical considerations or regard for the truth, and so instead of using either magnesium sulphate or sodium sulphate, which would have made a disagreeable, bitter dose, but either of which would have been in approximate harmony with the claim for composition, he used Rochelle Salt, which never has been and never can be found in a natural spring water, for it is a compound partly of vegetable origin.

Seidlitz Powders immediately attained a great popularity and were in great demand. In 1824, the Philadelphia College of Pharmacy published an exposure of the composition of eight prominent nostrums of that time, and among these was the formula for Seidlitz Powders, which soon found a place in the various pharmacopœias of the world, and are still esteemed as a household remedy and are also prescribed by physicians.

There should not be any doubt about the origin or meaning of the word "Laudanum," although lexicographers seem not to be entirely in agreement upon the subject. Paracelsus first used the word about 1530, in connection with a secret remedy which he used. He said "Ich hab ein Arcanum, heiss ich Laudanum; ist über das alles wo es zum Tod reichen will."

It is not certain that Paracelsus used the word in connection with a preparation of opium, although he is said to have carried a piece of opium in the pommel of his sword, and extolled it as a remedy, calling it "the stone of immortality." For more than a century after Paracelsus' time, the term "laudanum" was applied to solid

preparations, some containing opium, others of purely mineral origin. The first few editions of the London Pharmacopœia, of which the initial issue occurred in 1618, contained a formula for a solid preparation of opium under the name of Laudanum. This preparation contained opium, saffron, castor, diambra, ambergris, musk, and oil of nutmeg, all of which were first to be made into a tincture, which was later evaporated to form a pill mass.

I have found a pharmacopœia edited by Guiseppe Quercetano, published in Venice in 1619, in which there is quite a discussion of the origin of the name. It is stated to be from the Latin *laudo*, to praise, because of the praiseworthy character of the remedy, which is believed to be similar to the nepenthes of Homer. Formulas are given by Quercetano for laudanum of nominal cost and one called "Excellentissimum." The latter formula contains as the basic ingredients, opium and saffron, which are later to be compounded in a vessel of silver with pearls, hyacinths, coral, terra sigillata, bezoar, unicorn, and ambergris—surely a costly and rare assortment of drugs, worthy of a silver setting.

The laudanum which we know, which is a liquid preparation of opium made with alcohol, was doubtless evolved from the liquid preparation of that name originated by the celebrated English physician Sydenham, who described it in 1669 and speaks of it as being good for the plague. As Sydenham is reported as having fled from London during the plague of 1665, at which time the apothecaries remained to fight the epidemic and gained great *kudos* thereby, his knowledge is probably second hand. Sydenham's preparation was made from opium and saffron, extracted with Canary wine, and a formula of that character is still known by the name of Sydenham's Laudanum, and is official in the National Formulary under the Latin title of *Tinctura Opii Crocata*.

Sydenham undoubtedly obtained his basic idea from one of the formulas previously quoted, retaining only the opium and saffron and making it into a liquid preparation. He himself is quoted as saying: "I do not believe that this preparation has more virtues than the solid laudanum of the shops, but it is more convenient to administer."

Sydenham's opinion of opium and of laudanum is worth repeating as showing the attitude of his period toward a narcotic drug which the whole world now fears and is attempting to control. "Of all the remedies which a kind providence has bestowed upon mankind for

the purpose of lightening its miseries, there is not one which equals opium in its power to moderate the violence of so many maladies and even to cure some of them. Medicine would be a one-arm man if it did not possess the remedy. Laudanum is the best of all the cordials; indeed it is the only genuine cordial that we possess today."

In the *Pharmacopœia Schroedero-Hoffmanniana* of 1687, we find a formula for a laudanum called "*Electuarium hystericum seu Laudanum Facile*." This is one of the typical examples of polypharmacy of that period. The following ingredients are classified into groups: of precious stones, there were emeralds, sapphires, hyacinths, topaz, coral, and pearls; of roots, galangal and rhubarb; of gums, acacia, opoponax, galbanum, thus, mastic, bdellium, sarcocolla, and euphorbium; of seeds, coriander, fennel, and cardamom; of miscellaneous drugs, salt, opium, cinnamon, oil of turpentine, honey, alcohol, and *aqua Imperialis*. *Aqua Imperialis* is a compound preparation in itself, containing twenty ingredients, so in this electuary, which was directed to be given in a three-grain dose as an anodyne and antispasmodic, there are nearly fifty ingredients.

One of the variants of laudanum which attained great fame was a preparation made with vinegar instead of alcohol as a solvent. This was three times as strong in opium as ordinary laudanum, and was called "*Quaker Laudanum*" or more commonly "*Black Drop*."

Lovers of Dickens will remember with amusement that in the celebrated trial of *Bardell vs. Pickwick*, the chemist asked to be excused from jury duty on the ground that the boy who was left in the shop had the impression that "*Epsom salts means oxalic acid, and syrup of senna, laudanum.*"

Paregoric is another opium preparation in which the name has been found to be associated with a number of preparations of a character distinctly different from the paregoric of today. Our preparation originated with Dr. Le Mort, Professor of Chemistry at the University of Leyden (1702-1718). The formula, as given in the *London Pharmacopœia* of 1721, under the Latin title "*Elixir Asthmaticum*," contained opium, honey, licorice, benzoic acid, camphor, oil of anise, potassium carbonate, and alcohol.

Later the title of *Elixir Paregoricum* was applied to this preparation, and during the 200 years that have intervened since it originated it has suffered many changes both in composition and nomenclature. The title "*Paregoric*" instead of being the Latin, has become the

English name. The name "paregoric" was used back in Greek and Roman times, and throughout the intervening period as a generic term meaning an anodyne, from the Greek *paregoricon* (soothing).

In the *Pharmacopœia Schroedero-Hoffmanniana* (1687) it is stated in the introductory portion of the book that Paregoric is an anodyne, and later, under *Tinctura Anodyna* (but without the synonym "Paregoric"), is given a formula for a preparation containing opium, benzoin, saffron, alcohol, castor, and salt of tartar. It is probable that this formula was taken by Le Mort as the basis for the preparation credited to him.

Both Paregoric and Laudanum were given titles that seem to have been used, respectively, for a variety of preparations up to within very recent times. A "*Pharmacopœia Universalis*" (1846), compiled officially by the authorities of Weimar, as the fourth edition of a similar work first issued in 1828 by Jourdan of Paris, contains formulas for over forty different kinds of Laudanum, and more than twenty different kinds of Paregoric. All of these preparations have opium as the common ingredient, but the variations in other respects cover a very wide range. The authorities quoted in this compilation number more than one hundred and cover a chronological range of over fifty years, beginning with the Amsterdam *Pharmacopœia* of 1792.

If Thomas Dover had not been at one time a devoted servant of the famous Dr. Sydenham of Laudanum fame, he probably would not have been filled with an ambition later to call himself a physician, for that was all that was needed in those days in Merry England to practice medicine, and the world would never have heard of Dover's Powder, and might never have had the benefit of this valuable remedy; and if this same Thomas Dover had not turned buccaneer for a few years the story of Robinson Crusoe would never have been written, for it was Captain Thomas Dover on the privateer "Duke" who rescued Alexander Selkirk on February 2, 1709, after he had lived alone on the island for more than four years, and whose story so appealed to DeFoe that the world gained a classic piece of literature.

Dover's privateering venture ended in 1710 with great profit, as he came back with a ship full of treasure in addition to a Spanish frigate of twenty-one guns, which he had captured. Although nearly forty years of age he shortly thereafter embarked upon the practice of medicine and became a free lance in the field, calling the College

of Physicians "a clan of prejudiced gentlemen," and complaining of the extortionate charges of the apothecaries of his day. He was a successful and popular practitioner for many years and before he died wrote a book called "The Ancient Physician's Legacy to His Country," which was a record of the cures that he had accomplished together with the remedies that he had used, and it was in this book that he describes the "diaphoretic," or sweat-producing powder, as he calls it, which was made by a much more complicated process than is used today, but in which the essential ingredients have been retained in their original proportions, which is unusual for a remedy nearly 200 years old, as this one is. Dover was a fearless practitioner in the matter of doses. He gave metallic mercury in such large amounts that he was known as the "quicksilver doctor." The modern physician gives Dover's Powder in doses averaging five grains. Dover usually gave it in sixty grain doses and claimed to have given as high as 100 grains, which is equivalent to ten grains of opium and ten grains of ipecac. It is little wonder that apothecaries who filled his prescriptions advised his patients to make their wills before taking the medicine.

Thomas Dover died in 1742 and as physicians in general were antagonistic to his teachings and his practice, his diaphoretic powder might have suffered oblivion had it not been for another celebrated character in English medical annals, who brought it into fame.

What constitutes quackery? In the case of Joshua Ward, the physician who made Dover's Powder famous, it must have been the fact that he entered the practice of medicine by the back door, as did Dover, for it is said by one of his biographers that he was originally a footman who collected the recipes that were later to make him famous, from monastery physicians on the Continent. Ward became a protégé of George II of England when he entered the practice of medicine at the age of forty-eight, and numbered among his friends such men as Chesterfield, Gibbon, Fielding, Reynolds, and Walpole. In 1748, when a bill was introduced into Parliament restricting the practice of medicine to those who were duly qualified, it contained a clause specifically exempting Ward by name from its provisions.

He had political aspirations as well, and was at one time returned to Parliament as a member from Marlborough. Upon a contest of the election, the Commission appointed to investigate the election, found that Ward had not received a single vote and ordered his rival

seated. The election officers in some of our large American cities must be descendants of the Marlborough electors.

Ward had a large number of secret remedies, almost all of which were powerful preparations of antimony, mercury, opium, or arsenic. Ward's Paste, Ward's Powder, Ward's Pills, Ward's Balsam, and Ward's Drops, were in more or less popular use for a century after his death, at which time his recipes were compiled by a friend and associate and published at the expense of the King, whose favor he had continuously retained. He had requested this of the King, and history shows that it was granted, but another favor which he asked was refused. It was that he be buried in Westminster Abbey in front of the altar or as near thereto as possible.

Ward had discovered the formula for Dover's most celebrated remedy in Dover's book, and had used it with effect under the resounding names of *Pulvis alexitericus*, *Pulvis sudorificus*, and *Pulvis anodynus*. Under the patronage of the King, he established a hospital and administered his remedies to poor people free of charge. Medical historians give but small space to either Ward or Dover. Pope embalmed the former in this illuminating quotation:

"Of late, without the least pretense to skill,
Ward's grown a famed physician by a pill."

Another famous remedy of about this same period was that introduced by Thomas Fowler, originally an apothecary in York, who later graduated in medicine from Edinburgh, and after practicing in several other localities, eventually went back to York and acquired a large practice. There was at that time on the market in Great Britain a patent medicine called "Tasteless Ague and Fever Drops," the originator of which is not known. Finding that this preparation was most effective, Dr. Fowler, with the help of an apothecary named Hughes, of whom Fowler says, "His industry, attention, and abilities in his professional line justly merit applause," effected the analysis of the nostrum, which he found to be an arsenical solution, and devised a formula for its duplication.

This is another of the preparations that has suffered very little change in its composition or method of preparation since the time of its introduction by Fowler in 1786, when he published a treatise entitled "Medical Reports of the Effects of Arsenic in the Cure of Agues, Remitting Fevers, and Periodic Headaches." This book made

Fowler's reputation and established the position of arsenic in the list of remedies of recognized value. As there was at times a prejudice against the use of the salts of the poisonous metals in medicine, which had resulted from the indiscriminate and lavish use of such remedies by physicians possessing little knowledge or judgment, Dr. Fowler suggested that the preparation be prescribed under the name of *Liquor Mineralis*, to conceal its real origin.

When a young drug clerk named Newton, better known to the world as Sir Isaac Newton, worked in the apothecary shop of Mr. Clark in Grantham, England, in 1660, it is very probable that he was called upon occasionally to dispense a preparation known by the name of Friar's Balsam, a vulnerary medicine containing balsamic drugs from the New World. A half century later when Lemery was practicing pharmacy in the Rue Grande, Paris, the same preparation, which had increased in popularity, had been enveloped in the mystery and complexity of the medicines of that period, and was known by the formidable names of *Balsamum Equitis Sancti Victoris* (Balsam of the Holy Victorius Knights), or *Balsamum Commendatoris* (Commander's Balsam). Again, a half century later, when Antoine Baumé, the inventor of the hydrometer which bears his name, was clerking in the famous pharmacy of Geoffroy at Paris, a closely similar preparation was called for under the names of *Balsamum Catholicum* (Catholic Balsam), or *Balsamum Traumaticum* or *Balsamum Vulnerarium* (Wound Balsam).

Still another quarter of a century later, when Carl Wilhelm Scheele was practicing pharmacy in his little apothecary shop at Köping, Sweden, the preparation was known by the names of "Jesuits' Drops," or "Swedish Balsam," and Joshua Ward, of Dover's Powder fame, had used it under the name of "Ward's Balsam." During this period or later, this very popular remedy came to be called Wade's Drops, Turlington's Balsam of Life, Balsam de Maltha, Jerusalem Balsam, Balsamic Tincture, Wound Elixir, Vervain's Balsam, Persian Balsam, or Saint Victor's Balsam.

As made today, for it is still esteemed by the medical profession and occupies a place in the latest edition of the U. S. Pharmacopœia, it contains aloes, storax, tolu, and benzoin, dissolved in alcohol. In medicine it is mainly used in bronchial affections today, either internally or as an inhalant. It finds a use in many toilet preparations, as

for instance, in the lotion of benzoin, glycerin, and rose water, so popular for chapped hands.

Contrast the formula and these few uses with the formula and uses as quaintly described by Monsieur Pomet, Chief Apothecary to Louis XIV of France, in his History of Drugs, fourth edition, English translation published in 1748:

"The Balsam of the Governor of Berne, given me by Mr. Pinnodan, the King's Lieutenant of Toul in Lorrain. (This was Latinized as *Balsamum de commendatore du Berne*.)

"Take of dry Balsam of Peru, one ounce; Storax, in tears, two ounces; Benjamin (gum benzoin) three ounces; Aloes Succotrine, Myrrh, Olibanum in tears, Roots of Bohemia Angelica, Flowers of St. John's wort of each half an ounce; Spirit of Wine (alcohol) one quart; beat all together and put them into a bottle well stopped, which hang in the sun in the Dog-days.

"The virtues of this Balsam are: First of all, it is an admirable balsam for all kinds of wounds; it is also excellent given inwardly for the cholick, taking four or five drops in a glass of claret. It is also sovereign in the gout, applied to the foot affected with a feather or cotton. For the toothache it is wonderful, applied to the teeth with cotton that has been steeped in it. It cures all sorts of ulcers and cancers, cures the bites of venomous creatures and mad dogs; is good to prevent the marks of smallpox by rubbing it upon the pimples as they appear upon the face. It is excellent for the piles, inflammation of the eyes and pains of the stomach."

The century in which Pomet wrote these words, and the one preceding it, constitute the period of greatest credulity and secrecy in regard to medicines. This was the period in which the crowned heads of Europe vied with each other in honoring and rewarding the discoveries of new remedies. Among the royal patrons of medicine and pharmacy were Louis XIV of France, who purchased Helvetius' secret for a dysentery remedy in 1686 for one thousand Louis d'or and gave the knowledge of ipecac to the world; Charles II of Great Britain, who gave the discoverer of Goddard's Drops (a long since forgotten preparation made from human bones and known as "Sal Volatile Oleosum"), six thousand pounds sterling for the formula; Louis XV of France, who purchased the formulas of Glauber's Kermes Mineral and LaMothe's Tincture (both of which are buried

in the therapeutic graveyard of the past) for large sums; Empress Catherine II of Russia, who paid Bestucheff three thousand roubles for a preparation called "Bestucheff's Tincture," almost identical with that purchased a few years previously by Louis XV under the name of LaMothe's Tincture; Louis XVI of France, who purchased the cinchona-containing nostrum from Talbor, the English quack, for two thousand guineas, and Madam Nouffler's Tapeworm Remedy for 18,000 livres (the latter preparation introducing the drug called "malefern" to scientific medicine, in which it still holds a place); Emperor Joseph II of Austria, who paid 1500 florins for the formula for a secret febrifuge, which lost its popularity and prestige as soon as it came to be known that it was made from the common boxwood, the hedge plant.

This was the period, too, in which patent medicines originated. This term originally meant remedies that were actually protected by letters patent, for the so-called patent medicines of today are simply nostrums of proprietary origin in which there is no accountability for either nature or uniformity of composition to any authority whatever, nor any legal control or supervision of their manufacture. It is a reflection upon the good judgment or integrity of present-day legislators, that while the practice of medicine and of pharmacy are hedged about with legal restrictions and safeguards, anyone who chooses may enter into the business of manufacturing a secret nostrum with no inquiry into his or her qualifications.

The first medicine to be actually patented in Great Britain was the same Goddard's Drops for which Charles II paid such a fancy price, after which the preparation very properly lapsed into the limbo of forgotten things. Bateman's Pectoral Drops, Hooper's Female Pills, Betton's British Oil, James' Fever Powder, Roche's Embrocation, and Savory's Seidlitz Powders are among the better known medicines which were originally patented in Great Britain.

Secrecy, mystery and superstition have been the indispensable ingredients of many successful prescriptions and remedies from the time of the earliest Egyptians down to and including the present.

The evolution of the nostrum, that blot upon scientific medicine and pharmacy, for which both professions are jointly responsible, is a separate story altogether. From these mysterious polypharmaceutical monstrosities which were evolved by the physicians of the seventeenth and eighteenth centuries and used by them as secret remedies, has

developed the modern nostrum traffic, a veritable Frankenstein taking toll in the United States alone to the extent of more than \$200,000,000 annually, or enough to endow pharmaceutical and medical education and research for the permanent benefit of mankind; but the people must have their illusions at any cost, and the more intelligent people become and the greater the amount of popular education, the more credulity there seems to be about medicines. This has had a bad effect upon the practice of medicine itself, for probably in consequence of a hereditary professional inferiority complex, medicine has turned in part to therapeutic nihilism, and as a by-product of this trend has been the development of "bone bouncers" and many other well known 'pathics and 'practics, who owe their practice and their success to "Romance," in a different sense, however, from that in which it is used in this lecture.

There are some things to be thankful for, for during Pharmacy Week, when the public were given some idea of the making of medicines and many pharmacies had creditable displays of drugs and preparations in the making, there was no such exhibit as Garth described, of a pharmacy of several centuries ago:

"Here mummies lay most reverently stale,
And there the tortoise hung her coat of mail;
Not far from some large shark's devouring head,
The flying fish their finny pinions spread.
Aloft in rows large poppy heads were strung,
And near a scaly alligator hung.
In this place, drugs in musty heaps decayed,
In that, dried bladders and drawn teeth were laid."

Nor does the pharmacist of today have the reputation for extortion that his confreres of the times of William II and George I of England, when it was said:

"Thrice happy were those golden days of old,
When dear as Burgundy, ptisans were sold,
When patients chose to die with better will,
Than live to pay th' apothecaries bill."

There must be romance in medicines, for science, art, and literature have all drawn strength and inspiration from this fertile field.

NOTES ON THE U. S. P. X.

By J. W. England, Ph. M.

THE ISSUANCE of every new revision of the United States Pharmacopœia marks an epoch in the history of American pharmacy, and the issuance of the tenth decennial revision is no exception to the rule. It maintains the fine traditions of its predecessors and is still "the aristocrat of pharmacopœias," as once called. It is of the highest scientific character. There are some features that are open to criticism, but in a work of such complexity and magnitude as this, by a committee of more than fifty members, it was inevitable that there should have been differences of opinion and compromises. The marvel is that such splendid work has been done and the task so successfully completed. As the *Pharmaceutical Journal* of London (October 10, 1925), states: "The team work was magnificent and E. Fullerton Cook, the chairman of the Revision Committee, and all who collaborated in a service of such high national and international importance and value, deserve the warmest thanks, not only of the interests immediately concerned, but also of the world at large."

It is of interest to note that the pages of the U. S. P. X., number 626, as against 728 of the previous revision, the official articles number 633, as against 782 previously, and the classes of preparations number 34 instead of 35.

The writer does not desire to systematically review in detail the new revision, but to submit a study of some of its more striking changes.

The outstanding feature of every revision of the Pharmacopœia is the character and extent of its additions and deletions. This is the index of progress. The additions to the U. S. P. X. number 40, and the articles deleted, that is official in the U. S. P. IX. and not admitted into the U. S. P. X., number 191.

The additions have been admirably selected.

The deletions have been well chosen, with some notable exceptions. The function of the U. S. Pharmacopœia is to serve the needs of the medical and pharmaceutical practice, not of a city or section, but of the cities and sections of the whole country; and that this has not been done, in some instances, at least, is indicated by the fact that among the "throw-outs" there are such therapeutically worth-while and widely used articles as: Nitrohydrochloric acid, ammonium iodide,

aromatic powder, chondrus, hamamelis water, crude calcium sulphide, cantharidal collidion, iron and quinine citrate, compound spirit of juniper, spirit of ether, diluted solution of lead subacetate, compound pills of rhubarb, solution of ferric subsulphate, liniment of ammonia, sparteine sulphate, strontium bromide, tincture of arnica, tincture of cannabis, ammoniated tincture of guaiac, tincture of gelsemium, etc.

Dr. Hobart A. Hare writes me: "Nitrohydrochloric acid is a very useful remedy, as much so as the other mineral acids. Cantharidal collidion is more efficient than the plaster. Liniment of ammonia is a very excellent preparation, as is also diluted solution of lead subacetate. Compound rhubarb pills have been used for generations, as has also aromatic powder. Spirit of ether is as useful as aromatic spirit of ammonia. Compound spirit of juniper, which was struck out, I presume, by the prohibitionists, because it resembles gin, is a useful preparation in the absence of gin. Tincture of gelsemium is highly thought of by some practitioners."

Dr. Reynold Webb Wilcox states: "Ammonium iodide is highly esteemed in chronic bronchitis and pulmonary emphysema. Calcium sulphide is useful in the prevention and treatment of boils, carbuncles, abscesses, etc. Probably the most useful application of guaiac is in the treatment of pharyngitis and tonsillitis, used as a gargle, and also internally, where it often serves to abort the disease, or at all events to reduce the inflammation. In chronic sore throat it is also sometimes of service. The ammoniated tincture, diluted, may be employed as a gargle. As the scale preparations, iron and ammonium citrate, and iron and quinine citrate, rarely disagree, they are much used for patients with weak digestion, and small doses can generally be continued for an indefinite period. Sparteine sulphate is a very useful diuretic in dropsy from heart disease or chronic nephritis."

Otto Raubenheimer points out (*Drug. Circ.*, 1925, 362): "There are eight vegetable drugs official in the U. S. P. X. without any preparations, or without entering into any compound preparations, namely: althea, cubeb, eucalyptus, linum, lycopodium, manna, pepo and quassia." Why the demulcents althea and linum should be retained and chondrus dismissed is a mystery. Another mystery is why fluidextract of cannabis (dose, 1½ minims), official in the U. S. P. IX., was recognized in the U. S. P. X., and tincture of cannabis (dose, 12 minims), official in the U. S. P. IX., was *not* recognized in the U. S. P. X., when the latter preparation is, by far, the more convenient form of cannabis for dosage and administration.

Harry V. Arny states (*Bulletin of Pharmacy*, 1925, 448): "Only four galenicals have been added to the U. S. P. X., while eighty-seven of the galenicals of the U. S. P. IX. were deleted."

The saving factor in the situation is that many of the articles deleted from the U. S. P. X. will be recognized as official in the forthcoming edition of the National Formulary (N. F. V.). "The New National Formulary will be a more valuable book to the dispensing pharmacist than the new U. S. P. will be." (H. V. Arny.)

The danger to the Pharmacopœia in the unnecessary and excessive deletion of its articles and their recognition by the National Formulary is that the latter may become, in time, the pre-eminent authority in the medical and pharmaceutical practice of the country; and this would be most regrettable.

Both the U. S. P. and the N. F. are legal standards under the Federal and State laws.

If a former U. S. P. article is recognized by a later N. F., the standards adopted by the latter only are legal.

If a former U. S. P. article is not recognized by the N. F., it is no longer official, but comes under the jurisdiction of the National Food and Drugs Act, passed by Congress on June 30, 1906, which act was followed by similar legislation in the various states of the Union. "These laws make the United States Pharmacopœia and the National Formulary the standards for drugs" (U. S. P. X., X.). That revision or edition only is official, which is "official at the time of investigation" (National Food and Drug Act, 1906, Sec. 7).

The National Act states that:

"The term 'drug' as used in this Act, shall include all medicines and preparations recognized in the United States Pharmacopœia or National Formulary for internal and external use, *and* (italics mine, J. W. E.) any substance or mixture of substances intended to be used for the cure, mitigation, or prevention of disease of either man or other animals."

This definition is very important at the present time.

It so happens that 191 articles have been deleted from the U. S. P. IX. and have not been admitted into the U. S. P. X. These may or may not be recognized in the N. F. V., which will not become effective until July 1 next.

Now what is the legal status of such articles? Their standards will be dead, legally, as the U. S. P. IX. will no longer exist as a legal standard after January 1, 1926, and the N. F. IV. after July 1,

1926. They will be orphans. But fortunately they will still have a home under the general provisions of the Federal and State drug acts referred to above; and in all probability the U. S. Department of Agriculture will accept as the legal standards for such articles the standards of the U. S. P. IX. and the N. F. IV.

It is unfortunate that the U. S. P. X. and the N. F. V. could not have been made effective as of the same date; they should be in the future, so as to avoid legal complications.

Object and Scope

The object and scope of the Pharmacopœia has been broadened to provide standards for drugs of therapeutic usefulness, or pharmaceutic necessity, sufficiently used in medical practice throughout the United States and its possessions to justify official recognition; and this is a very important forward step. Formerly, the extent of use was largely the criterion for recognition. Years ago an eminent therapist facetiously said: "If brickdust is widely used in medical practice, brickdust should be in the Pharmacopœia." Fortunately, "much water has passed under the bridge" since this opinion was expressed, and with the pre-eminent authority of the Pharmacopœia since it became a legal standard under the Federal and State Food and Drug Acts, therapeutic usefulness or pharmaceutic necessity, as well as extent of use, have rightly become the standard for official recognition.

Nomenclature

In the matter of nomenclature much could be said, but it is sufficient to note that a distinct advance has been made by requiring that botanical changes shall conform with the rules of the International Botanic Congresses. It is unfortunate, however, that the authority given to the Committee of Revision to coin short euphonious titles for synthetic chemicals with lengthy or unwieldy names, contracted, if possible, from true chemical names, has not been exercised more freely. Thus, we have sulphonmethanum, sulphonethylmethanum, phenol-barbitalum, phenolsulphonphthaleinum, sodii indigotindisulphonas, etc.

It should not be impossible, generally, to coin short, euphonious titles for synthetic chemicals that would be sufficiently expressive of chemical composition, although there are certain compounds with which this is impossible. In such cases, why should not the Pharmacopœia take "a leaf out of the book" of German chemists, who coin short, arbitrary names that do not indicate chemical composition, and have such names registered as trade-marks under the United States Patent Laws. A short name, even if meaningless, given a meaning by use, will live; a lengthy name will not be used or at best, most limitedly.

The use of the prefix "sub" in modern chemical nomenclature is rapidly becoming obsolete, the term "basic" or "oxy" taking its place. It is pleasing, therefore, to note that the popular names of the official bismuth compounds—the subcarbonate, subgallate, subnitrate, and subsalicylate, have been given as basic or oxycompounds—oxycarbonate, oxygallate, oxynitrate and oxysalicylate.

Perhaps, in the next revision, the Latin and English titles may be made to accord with the new popular names, through custom and long usage is hard to change.

Weights and Measures

In the ninth decennial revision the term cubic centimeter was replaced by the word "mil," the United States Bureau of Standards having declared that the term cubic centimeter was a misnomer, there being a slight difference between the thousandth part of a liter and the cubic centimeter, as one liter was determined to be equivalent to 1.000027 cubic decimeters.

But such a difference, in practical work, has no significance, being equivalent to less than one-half of a minim to a quart!

The tenth decennial revision states that the adoption in the U. S. P. IX. of the designation "mil" as the more correct of the designations of the one-thousandth part of a liter did not prove to be satisfactory, and the Committee decided to return to the almost universally used term "cubic centimeter" (cc.). It is understood, however, that the cubic centimeter of the Pharmacopœia represents the one-thousandth part of a liter.

This decision brings the Pharmacopœia, in this matter, in accord with modern chemical practice.

Doses

The United States Pharmacopœial Convention of 1920 adopted the following "general principle" concerning doses, essentially the same as that of the previous convention, referring it to the Committee of Revision:

"Doses—it is recommended that in stating doses in the Pharmacopœia for substances which are used, or likely to be used, for medicinal purposes, the Committee of Revision be instructed to state the average approximate (but neither a minimum nor a maximum) dose for adults, and where deemed advisable, also, for children." (U. S. P. X. XLIV.)

Now, what did the Convention mean by an "average approximate dose"? Did it mean a *single* dose, or did it mean "dose" in a generic sense, as expressed in the usual text books?

The Sub-Committee on Therapeutics and Pharmacodynamics of the Committee of Revision interpreted the intent of the Convention as being "the average dose that could be expected to produce therapeutic results under the usual or average conditions" (*Jour. A. Ph. A.*, 1925, 991). But what is an "average dose"? Is it a single average dose, or is it a range of quantities expressing the average dose? The former view has been the one officially adopted.

Therapeutically there is no such thing as a "single average dose." As Dr. S. Solis-Cohen has said, "A dose is *enough*," and by this term is meant "enough" of the drug to elicit a certain body reaction or reactions under the conditions of the individual-body at the time the dose is given. That dose may be more or less with different individuals, or with the same individual at different times; but it is always "enough." Hence, there can be no "single average dose." There can be, however, a range of quantities expressing the ordinarily sufficient dose for individual cases, but this is not a minimum or maximum dose or an average of the two. Minimum and maximum doses, as the terms imply, are the "smallest"

and "largest" doses that can be given therapeutically, *i. e.* with the result, on the one hand, and without danger on the other; and an average of these is a far cry from the "average dose."

The single dose-system of the U. S. P. X. is valueless. It should be a system in which "the average dose" is expressed by a range of quantities, and it is a question whether this was not what was in the minds of the delegates to the ninth and tenth Pharmacopœia Conventions—to which the writer was a delegate—when the resolution on doses was adopted.

How much more expressive of the "average dose" the British Pharmacopœia "dose" is than our own Pharmacopœia, is strikingly shown by the following examples: Morphine hydrochloride B. P., $\frac{1}{8}$ to $\frac{1}{2}$ grain (U. S. P. X. $\frac{1}{8}$ grain); strychnine hydrochloride B. P., $\frac{1}{64}$ to $\frac{1}{16}$ grain (U. S. P. X. $\frac{1}{30}$ grain); mercuric chloride B. P., $\frac{1}{32}$ to $\frac{1}{16}$ grain (U. S. P. X. $\frac{1}{15}$ grain); potassium citrate B. P., 15 to 60 grains (U. S. P. X. 15 grains); ammonium chloride B. P., 5 to 20 grains (U. S. P. X. 5 grains); potassium and sodium tartrate B. P., 2 to 4 drachms (U. S. P. X. $2\frac{1}{2}$ drachms); powdered ipecac and opium B. P., 5 to 15 grains (U. S. P. X. 5 grains).

Doses of Articles Not Used as Such

When doses are given to articles in the Pharmacopœia it implies that the articles are used medicinally *as such*, but there are numerous instances where such is not the case and the expression of dosage is misleading.

Some of the official articles which are not used medicinally *as such* are: Aconite, belladonna root, buchu, cannabis, calumba, cinchona, colchicum seed, ergot, hydrastis, nux vomica, cascara sagrada, salicylic acid, etc.

It may be claimed that the expression of dosage for these articles is necessary because official preparations are made from them, but no doses are given for hydrochloric, phosphoric and sulphuric acids, and these are used in the making of official preparations.

Furthermore, the Sub-Committee on Therapeutics and Pharmacodynamics decided to omit the dosage for drugs which were admitted to the Pharmacopœia for pharmaceutical rather than therapeutic reasons, such as many of the crude drugs. (*Jour. A. Ph. A.*, 1925, 991). Obviously this was not done in the instances cited above.

General Formulas

The principle of general formulas for the preparations of fluid extracts and tinctures has been extended to include aromatic waters; which is a step forward towards the greater simplification and standardization of official processes for pharmaceutical preparations. The next revision could well include type processes for the extracts, both the pilular and powdered.

Alcohol Percentage of Official Preparations

The ninth revision of the Pharmacopœia gave the percentage by volume of absolute alcohol in the official preparations in tabular form (p. 593); the tenth revision gives the range of the content of absolute alcohol by volume in the text of each preparation containing alcohol, which makes for direct and easy reference and is a very marked improvement.

Alkaloidal Assays

Four type processes are now used—types A and B for drugs and types C and D for galenical preparations. John G. Roberts, of the Analytical Department of the Smith, Kline & French Company, writes me, as follows:

"The assay processes of the U. S. P. X. differ but little from those of the U. S. P. IX. The most important change consists in the use of a percolation method instead of the U. S. P. IX. 'aliquot-part' method in the assay of belladonna, hyoscyamus and stramonium. This is a change, but in my opinion, not an improvement. The U. S. P. IX. method yields concordant results and is more convenient and less time-consuming.

"The directions for the assay of hyoscyamus require that the final chloroformic extraction be evaporated *spontaneously*, instead of by heat, as heretofore, which is a decided improvement. We anticipated this procedure years ago in our laboratory, and have followed it with satisfactory results.

"The chemical assay of aconite has been deleted from the U. S. P. IX., and the biological assay only prescribed. This is an improvement, as the results of the chemical assay do not satisfactorily indicate physiological activity."

Biological Assays

The U. S. P. X. has taken an important forward step in making its biological assays compulsory; formerly they were regarded as too experimental for compulsory use and were almost entirely optional.

As Chairman C. W. Edmonds, of the Sub-Committee on Bio-Assays, states (*Jour. A. Ph. A.*, 1925, 991): "This plan served to center interest and experiments upon the official processes and prepared the way for the requirements of the U. S. P. X. Another feature has greatly helped in making these standards practicable, namely the co-operation of the Bureau of Chemistry in voluntarily offering manufacturers type-products conforming to the U. S. P. requirements. By all checking the activity of their preparations against the same standards, a uniformity not otherwise possible can be obtained."

Committee on Drug Markets

One of the most important decisions of the Convention of 1920 was its recommendation that the Committee of Revision appoint a special committee on drug markets to investigate the quality of crude drugs in commerce, determine the proper limits of variability due to soil and climatic conditions or collection or handling, and suggest such improvements as can be introduced in the collecting, marketing and preservation of crude drugs.

By this admirable procedure much authoritative data can be collected, which will lead to better quality and more uniform drugs, and will be especially helpful in promoting the growing and marketing of American grown vegetable drugs.

Alcohol

It is most unfortunate that the popular name of ethanol should have been given to alcohol, because its use is fraught with serious danger. When the popular name of methanol was coined for methyl or wood alcohol, it was done

for the purpose of sharply differentiating between the two alcohols—the poisonous wood alcohol, and the non-poisonous grain alcohol, so that the one might not be mistaken for the other. Now that this distinction is broken down by the use of the similar words methanol and ethanol, one may expect the poisoning of those who get methanol for ethanol.

Arsenic Trioxide

As is well known, arsenic trioxide is but slowly soluble in water, and in order to induce uniformity of absorption the U. S. P. X. directs that: "Powdered Arsenic trioxide when administered in solid form, as in powders, tablets and pills, must consist of particles not greater than 0.0125 mm. in diameter. The fine degree of subdivision of the powdered form of this arsenic trioxide renders it more soluble, and therefore more effective than the powder previously official. This should be borne in mind in adjusting the dosage."

But there is no change in the official dosage; it is the same as in the U. S. P. IX—1/30 grain. If the newly official "arsenic" particles—about 1/2000 inch in diameter—are so much more soluble and absorbable than the powder previously official, it would seem that its dose should have been reduced when used in powder, tablets and pills. The dose of the British Pharmacopœia for the same compound, which it calls by the older name of arsenious acid (or arsenious anhydride), and similar in physical properties to the product of the U. S. P. IX., is 1/64 to 1/16 grain.

Brandy and Whisky

For the first time since the enactment of the National Prohibition Act of October 28, 1919, "providing for the enforcement of the Eighteenth Amendment of the Constitution of the United States," Brandy (*Spiritus Vini Viti*) and Whisky (*Spiritus Frumenti*) have been recognized by the United States Pharmacopœia (U. S. P. X.).

These articles are medicinal agents (as well as beverages) and their official recognition by the United States Pharmacopœia as a drug is a logical step and to be commended.

Brandy is defined as "an alcoholic liquid obtained by the distillation of the fermented juice of sound ripe grapes and containing not less than 48 per cent. and not more than 54 per cent. by volume of C_2H_5OH , at 15.56° C. It must have been stored in wood containers for a period of not less than four years."

Whisky is defined as "an alcoholic liquid obtained by the distillation of the fermented mash of wholly or partly malted cereal grains, and containing not less than 47 per cent. and not more than 53 per cent. by volume of C_2H_5OH , at 15.56° C. It must have been stored in charred wood containers for a period of not less than four years."

It should be noted that whisky made from any malted cereal grain is recognized as official, provided it meets "the standard of strength, quality or purity as determined by the test laid down in the United States Pharmacopœia." It must be a "straight" whisky or a whisky meeting the U. S. P. X. test. It must be "not less than four years old." To ensure this it may be necessary for the

United States Revenue Department to require that all whisky shall be stored by the distiller in bonded warehouses for not less than four years before being sold.

Whisky can be legally sold at retail only on order or prescription of a permitted physician upon a permitted pharmacist, and whisky of differing standards from those of the United States Pharmacopœia cannot be sold under Section Seven of the National Food and Drugs Act, as with other official drugs. *The only legal whisky is that of the U. S. P. X.*

The best protection to the retailer is to buy U. S. P. brandy and whisky only from reputable dealers with the guarantee that the articles comply with the tests of the U. S. P. X.

Ether

Ether of the U. S. P. X. contains 96 to 98 per cent. of ethyl oxide, "the remainder consisting of alcohol and water"; the ether of the U. S. P. IX. contains 95.5 to 97.5 per cent. of ethyl oxide, "the remainder consisting of alcohol and containing a little water."

The change is of no practical significance in surgical anesthesia, for which purpose ether is so largely used; but it is exceedingly interesting to learn that altitude is an important factor in ether-anesthetization, as indicated by the following letter I have received from Joseph Rosin, of Powers-Weightman-Rosengarten Company:

"From time to time recommendations have been advanced in the literature and elsewhere that for anesthesia Ether free or practically free from alcohol, usually termed Dry Ether, be used exclusively. These suggestions have generally emanated more from laboratory workers than practitioners. They have failed to take into view an important factor, namely geographic considerations.

"Strange as it may seem at first sight, geography has a bearing on the anesthetic qualities of ether. This relationship, however, becomes very simple and evident when we reflect upon the first principles of physics and the properties of ether. At higher altitudes liquids boil at a lower temperature than at lower altitudes. It is also known that alcohol, or for that matter, other liquids when present in ether retard the rate of evaporation of the ether. An absolute ether may be perfectly satisfactory at the eastern sea coast level, but when used say in the Rockies, it would evaporate so quickly that the patient would not enjoy the benefit of it.

"On more than one occasion Dry Ether put up at the same time in identical cans, etc., etc., were submitted to physicians in different localities in the United States, the physicians not being aware of the exact composition of the Ether except that it was U. S. P. Eastern clinics have almost invariably reported satisfactory results, but from the higher altitudes, Denver for instance, numerous complaints were received. Upon further investigation the unsatisfactory results at the higher altitudes were found to be attributable to the rapid rate of evaporation of the ether at those altitudes.

"The Revision Committees of the U. S. P. IX and X. have indeed done very wisely in permitting a range in the ether contents, and thus in the alcohol contents, not only because it would be impracticable to restrict the strength

to an inflexible figure, but also by allowing a range the practitioner is permitted to have his choice of a more or less dry ether to suit his conditions."

When ether is used for surgical anesthesia, the ether-vapor is inhaled with air. Reynold Webb Wilcox states that: "To produce narcosis it is necessary to give the ether in a more concentrated form than chloroform—about 70 per cent. of ethereal vapor and 30 per cent. of air." The rapidity and completeness of the anesthesia depends upon the body-conditions of the patient, the technique of the anesthetizer, and last, but not least, as Mr. Rosin has indicated, the chemical composition of the ether and the atmospheric conditions—pressure, temperature, etc., under which the ether is administered.

Infusion of Digitalis

The new formula for infusion of digitalis is essentially unchanged except that 10 per cent. of alcohol has been added to the finished infusion (as in the U. S. P. VIII), which is a decided improvement, as is also the filtration directed, instead of straining, as formerly. The formula could be further improved if the digitalis be macerated in water at ordinary temperature and not in boiling water. Boiling water rapidly cools and becomes warm and warm water facilitates the action of the natural enzymes of the leaf. The cinnamon water of the formula should be eliminated as it is too small in amount to have medicinal action or to flavor.

Some years ago ("Infusion of Digitalis," AMER. JOUR. PHARM., 1889, 345), the writer suggested the following formula for infusion of digitalis: macerate bruised digitalis leaves, 120 grains, and water, 14½ fluidounces, for one hour, filter, and add to the filtrate alcohol, 1½ fluidounces, and sufficient water to make one pint. The product keeps exceedingly well. It could be still further improved by using defatted digitalis leaves. The U. S. P. X. formula contains about 110 grains of digitalis in fine powder (about No. 60), to the pint.

As Otto Raubenheimer states (*Drug. Circ.*, 1925, 412): the "*Infusion of digitalis must be freshly prepared from the leaves.*"

The practice of making the infusion from the fluidextract (now made easy by the presence of alcohol in the new infusion) needs to be mentioned only to be unreservedly condemned. A diluted fluidextract of digitalis is *not* the therapeutic equivalent of infusion of digitalis. As the *National Standard Dispensatory* (1916, 851) states: "Infusion of digitalis contains the water-soluble principles of the drug, chiefly digitonin and digitalin, both of which, while sparingly soluble in water, increase the solubility of each other. It is a most valuable preparation of the drug and its large dose, as compared with that of tincture of digitalis, is due in part to the absence of digitoxin and other principles soluble in the hydro-alcoholic menstruum of the latter preparation. 1 fluid-ounce represents 7 grains of U. S. P. digitalis. Dose, two to four fluidrachms."

The U. S. P. X. dose of infusion of digitalis (same strength as of U. S. P. IX.) is given as 1½ fluidrachms.

Solution of Magnesium Citrate

The citric acid of the formula has been again increased—from 33 Gm. to 35 Gm. As the writer has previously stated ("The Excessive Acidity of the Official Solution of Magnesium Citrate," AMER. JOUR. PHARM., September,

1924), the solution of the U. S. P. IX. is too acid to be palatable, and the acidity of the U. S. P. X. product, as the writer points out in this, or a later, issue ("Solution of Magnesium Citrate U. S. P. X.," AMER. JOUR. PHARM.), is even more objectionable.

The excessive acidity of the new preparation will undoubtedly subject it to public criticism, and it would be well for pharmacists to label their "citrate" as follows: "If the solution is too acid for your taste, it can be reduced by slowly adding a *level* teaspoonful (or more) of sodium bicarbonate to the solution (after the bottle has been opened and effervescence has ceased), stirring after each addition."

The official formula permits the use of either potassium or sodium bicarbonate for "carbonating"; the former should always be used, as potassium citrate is a positive diuretic and sodium citrate is not, and diuresis is as important as purgation in the medicinal action of solution of magnesium citrate.

Chalk Mixture

Chalk mixture is now prepared directly from prepared chalk, glycerin, cinnamon water and distilled water, and not, as formerly, from compound chalk powder, with its prepared chalk, acacia and sucrose (cane sugar); objection having been made to the presence of the readily fermentable acacia and sugar in the mixture. But if the acacia *and* sugar are therapeutically objectionable in the mixture why are they not equally so in compound chalk powder? Both preparations are used for the same purpose.

The official formula for chalk mixture could be materially improved, by using precipitated calcium carbonate (precipitated chalk) in place of prepared chalk. Precipitated calcium carbonate is about 2.5 times as heavy, bulk for bulk, as prepared chalk. When the new U. S. P. X. formula is used, its prepared chalk precipitates so rapidly in the bottle that the larger part will be in the latter doses; this does not take place with precipitated calcium carbonate. In addition, the precipitated calcium carbonate is more rapidly efficient as an antacid, because it offers a much larger surface for neutralization by acids.

The elimination of the readily fermentable acacia and cane sugar, from the formula is very desirable, but why not use sugar of milk (lactose) to sweeten the mixture which is insipid without sugar? Sugar of milk is not readily fermentable, and while it is not as sweet as cane sugar, it is less apt to upset the stomach and is more readily digested. It is largely used in the modification of milk for infant feeding. Furthermore, in serous diarrhœas there is often putrefaction, and "Pohl, Biernacki, Rivighi, Winternitz, Schmitz and others have shown that sugar of milk has a specially strong preventive action on putrefaction" (Hammarsten).

The mixture should be always "freshly prepared," as needed, and not "recently," as indefinitely directed by the Pharmacopœia.

The following formula is suggested for the next Revision: "Precipitated calcium carbonate (precipitated chalk) 2 drachms; lactose 3 drachms; cinnamon water $1\frac{1}{2}$ fluidounces; distilled water sufficient to make 4 fluidounces.

For convenience in preparing such a mixture, a compound chalk powder could be made as follows: Precipitated calcium carbonate (precipitated chalk)

40 parts and sugar of milk 60 parts. Use 5 drachms of the powder to $1\frac{1}{2}$ fluidounces of cinnamon water and add sufficient distilled water to make 4 fluidounces.

Compound Mixture of Glycyrrhiza

Important changes have been made in the formula for this widely used remedy. The pure extract of glycyrrhiza has been replaced by fluidextract of glycyrrhiza, and the syrup by glycerin, which are pharmaceutical improvements, but the acacia has been deleted, and this is a therapeutic mistake, as acacia is one of the most efficient of demulcents for inflamed mucous surfaces. The mixture is clear when first made, but soon precipitates. It keeps better by reason of its about 11 per cent. of alcohol, and is more of an elixir than a mixture.

The dose of the mixture has been reduced from $2\frac{1}{2}$ fluidrachms to 1 fluidrachm; which is obviously a mistake. Each fluidrachm of the mixture contains about 7 minims of fluidextract of glycyrrhiza (U. S. P. dose 30 minims) antimony and potassium tartrate $\frac{1}{77}$ grain (U. S. P. X. dose $\frac{1}{20}$ grain), camphorated tincture of opium 7 minims (U. S. P. X. dose 1 fluidrachm), spirit of nitrous ether $1\frac{3}{4}$ minims (U. S. P. dose 30 minims).

The United States Dispensatory (1918, 701) give the following dose for the mixture of the U. S. P. IX., and there has been no essential therapeutic change in the U. S. P. X. formula (except the omission of the acacia): "Dose, from one-half to one fluidounce for an adult; one fluidrachm for a child two years old." The usual average dose is rarely less than from two to four fluidrachms.

Mucilage of Acacia

The new official formula for mucilage directs the addition of sodium benzoate (1 Gm. to 1000 cc.), stating that "Mucilage of acacia must not be dispensed if it becomes sour and mouldy."

The preservation of this mucilage with the anti-ferment sodium benzoate, even though the quantity be small (0.1 per cent.), is open to criticism.

Acacia consists, as is well known, chiefly of arabic acid (arabin) in combination with calcium, magnesium and potassium, and contains, also, oxidizing, peroxidizing and diastatic ferments. The acidity of acacia is quite marked. Martindale and Westcott (Extra Pharmacopœia, 1924), have reported on their examination of a number of samples of acacia for acidity, as follows: "All the samples were found to give an acid reaction, the amount of sodium hydroxide required to neutralize 1000 Gm. of gum varying from 2.48 to 3.2 Gm., an average of 0.284 per cent."

When sodium benzoate is added to mucilage of acacia, therefore, it is decomposed and benzoic acid is set free.

Mucilage of acacia is used as a demulcent in inflammatory conditions of the digestive tract, and if benzoic acid be present, it irritates and increases the inflammatory conditions; furthermore, its presence retards or inhibits the action of the digestive enzymes, and on continued use, deranges digestion. This is very important, especially when the digestive processes are subnormal by reason of diseased conditions.

But is there any real need for "benzoating" mucilage of acacia? In the average pharmacy mucilage of acacia is used in very small quantities, and the best method is to prepare it extemporaneously, as needed, using 160 grains of granulated acacia to each fluidounce of distilled water. As Remington has pointed out ("Practice of Pharmacy," by Joseph P. Remington, 1905, 747): "Granulated Acacia dissolves more readily in water, because it has lost during desiccation only a part of its moisture ("not more than 15 per cent." U. S. P. X., 9), while in preparing the finely dusted (pulverized) powder, the high heat necessarily used to dry it thoroughly, drives off nearly all the water. Its easy solubility and its absence of tendency to form 'lumps' cause the coarse powder to be preferred for solutions, emulsions, etc."

If mucilage of acacia is used in large quantities, it can be kept in glass bottles in a refrigerator.

Cod Liver Oil

The vitamins of cod liver oil are probably its most important constituents. These are the fat soluble A and the fat soluble D. Good cod liver oil contains from 30 to 100 times as much vitamine A as good butter.

The U. S. P. X. states that "Cod Liver Oil may be assayed for its vitamine A potency and should then contain at least 50 units per Gm. Cod liver oil so assayed must be labelled: 'This unit is not a measure of its antirachitic activity.'" Practically any normal oil will meet the standard, although reworked oils will not.

The official assay is permissive, not obligatory, but it is singular to note that, after providing for an assay of vitamine A in cod liver oil, no provision is made for an assay of vitamine D. The latter is more important than the former. It is the antirachitic element of the oil that makes it a specific for rickets, for which it is so largely used. This omission is all the more remarkable for the reason that the U. S. P. X. requires, in its process of assay for vitamine A, that "the antirachitic requirements of the rats (used as breeders), shall be assured."

In this connection, Dr. Joseph S. Hepburn, Associate Professor of Chemistry in the Hahnemann Medical College of Philadelphia, and an expert in vitamine-assaying, writes me as follows:

"The chief therapeutic use of physiologically assayed cod liver oil is in the treatment of rickets. Its value then lies in its content of vitamine D. Yet the assay is by designation and in fact an assay for the vitamine A content of the oil. The assayed oil must be labelled: 'This unit is not a measure of the antirachitic activity of Cod Liver Oil.'

"The purpose of the assay apparently is two-fold, to test the cod liver oil for both growth-promoting and antixerophthalmic properties, for these statements are made:

"This assay is based upon the estimation of the minimum amount of Cod Liver Oil necessary to meet specific growth-promoting requirements in a standard test animal."

"The vitamine A potency of cod liver oil shall be expressed in units . . . , the unit to be the minimum daily amount of Cod Liver Oil required to cure

induced symptoms of vitamine A starvation in young albino rats, and to cause a gain in weight"

"The induced symptoms of vitamine A starvation are not defined, but may be inferred to be those of xerophthalmia. If merely the 7 days of stationary or declining weight is the sole symptom meant, a definite statement to that effect is lacking. Moreover, the requirement that, on the 35th day of the administration of the cod liver oil, the rat should show a definite gain in weight and also the cure of the induced symptoms of vitamine A starvation again suggests strongly that definite, unenumerated symptoms, in addition to loss of weight, should be present at the beginning of the period of administration of oil.

"The required gain in weight by a rat during the test period has a very wide range, 10 to 20 grams.

"Since a unit is the minimum daily dose of oil required to produce this gain in weight during the test period, and since each gram of oil must contain at least 50 units, it follows that the maximum daily dose of an acceptable oil is one-fiftieth gram. The preparation of this and smaller doses of the oil is not given.

"The actual performance of the assay would be greatly facilitated by suggestions concerning: (1) The number of rats to be used in a single assay, and (2) The daily dose of oil to be administered to each rat. (Each rat to receive the same dose daily, but the dose for each rat to be different from the doses for the other rats.

"The sex of the rats is not specified, although males and females do not grow at the same rate.

"These facts lead to the conclusion that the assay would require many rats and several months for its completion; and the results would be only a measure of the content of A vitamine, while the content of D vitamine is of major importance in the physiological standardization of cod liver oil."

Powdered Opium

Clinical experience has shown that deodorized tincture of opium is the preferable liquid preparation of opium for internal use because it does not cause nausea. The new tincture of opium is now the tincture of deodorized opium of the previous revision, but deodorized by the paraffin-method and not by the petroleum benzin method.

It will be noted that, while the official tincture of opium has been deprived of its nauseating principles, deodorized opium has been dismissed from the Pharmacopœia, and powdered opium has been retained unchanged. It would seem to be in order, in the next revision, to deodorize powdered opium, so that the preparations made from it—powdered ipecac and opium and camphorated tincture of opium, shall be deodorized, non-nauseating preparations, also.

Compound Cathartic Pills.

The newly official forty-letter sesquipedalian title of these time-honored pills is—*Pilulæ Hydrargyri Chloridi Mitis Compositæ* (Compound Pills of Mild Mercurous Chloride), the change having been made at the request of

physicians who objected to the title of *Pilulae Catharticae Compositae* (Compound Cathartic Pills) as being therapeutically suggestive!

The wisdom of the change may be doubted; as well might objection be raised to the use of the newly-official titles: *Diphtheria antitoxin*, *tetanus antitoxin*, *crude tetanus antitoxin*, and *small pox vaccine*. These also, are therapeutically suggestive!

It should not have been impossible to have framed a less cumbersome title. Nearly 150 years ago (1778) the first pharmacopœia published in the United States "for the use of the Military Hospitals belonging to the Army of the United States of America," compiled by Dr. William Brown, Physician General to the Hospitals of the United States, contained the following formula (From "The First Century of the Philadelphia College of Pharmacy," pp. 85-94):

"17 49: *Pilulae Calomelanae*.

"R. E. C. Calomel, ppt. scrupul, i; micæ panis scrupul, ii; Syrupi, q. s. Formetur massa in pilulas 20. Dosis i, ii vel iii. omni nocte, vel bis die."

If we *must* have a change in name, why not "*Pilula Calomelanos Composita*"? This was the former name of the British Pharmacopœia for Plummer's Pills (now "*Pilula Hydrargyri Subchloridi Composita*" B. P.). But why change?

Quinidine Sulphate

It looks odd to see a "caution notice" under the dose (5 grains, four times a day) of this compound, without giving some reason for such an unusual statement. It is not done with any other alkaloidal salt of the Pharmacopœia. The caution-notice is probably due to the fact that the compound is used in auricular fibrillation and in such condition caution is necessary, but the frequency of the dose should have been left to the direction of the physician.

Salicylic Acid

Salicylic acid should never be employed internally *as such*, and the official expression of dosage is unnecessary. As the United States Dispensatory (1918, 65) states "Salicylic acid is so irritant to the stomach that it is rarely used internally," and Cushny (*Pharmacology*, 1924, 493) writes: "When salicylic acid is applied for some time as a powder to wounds, mucous membranes, or even the skin, it may induce corrosion and necrosis. It sometimes causes soreness and irritation of the mouth and throat when swallowed in powder and congestion and even erosion of the mucous membrane of the stomach have been observed, even dilute solution often cause pain and discomfort in the stomach." Salicylic acid is applied locally to corns, warts and lupus for its corrosive properties.

Physostigmine Salicylate

Physostigmine salicylate is the most used physostigmine salt. "The cold saturated solution is neutral or *only faintly acid*" to litmus paper (U. S. P. X.). Physostigmine sulphate is largely used, also. "It is neutral to litmus paper" (U. S. P. VIII). Both salts are marketed in sealed glass tubes (1 to 15 grains

each) for the ready preparation of uniform solutions, but the solutions quickly redden and become inert. The cause of the decomposition is believed to be the *free* alkali of the glass container in which the solution is kept; light, also, may be a factor.

In certain eye-conditions physostigmine salicylate solution irritates the eyelids and causes conjunctivitis, probably because of traces of free salicylic acid (which is peculiarly irritating to the conjunctivitis on continued use), or of decomposition-products of the alkaloid, or both. In such cases it will be found that if physostigmine sulphate be dissolved in a one per cent. solution of boric acid in distilled water, the solution will not become pink or red for a number of weeks if kept in an amber bottle. The boric acid checks the action of the free alkali of the glass on the alkaloid and the amber glass excludes the actinic rays of light.

The faint acidity is due to the small quantity of salicylic acid in the saturated aqueous solution tested (1:75).

Dr. George E. deSchweinitz tells me that there is not the slightest objection, ophthalmologically, to the use of the boric acid solution as suggested.

The use of boric acid solution as a solvent for physostigmine salicylate would seem to be contra-indicated in the eye conditions referred to, because of the probable formation of free salicylic acid.

It is good practice to make all physostigmine solutions extemporaneously and in small quantities only.

Tincture of Digitalis

Since the writer originated tincture of fat-free digitalis ("Tincture of Fat-Free Digitalis," by Joseph W. England, AMER. JOUR. PHARM., July, 1899, 332), this preparation, which was made from defatted digitalis and diluted alcohol, of the official strength, has come into wide use; its advantages over the official product are greater permanency and apparently more rapid absorption. The U. S. P. X. now recognizes the fat-free tincture, but has improved on the original formula by using a menstruum of 4 volumes of alcohol to 1 volume of water (instead of diluted alcohol), which ensures still greater permanency, and by biologically assaying the finished tincture, which ensures greater uniformity of therapeutic action.

Tincture of Ginger

The official use of any of the three official gingers—Jamaica, Cochin or African, for making the official tincture of ginger, will lead to confusion, because, while their medicinal action is essentially the same, there is a marked difference in the physical properties of the tinctures made from them, and the consumer will get different products at different times. Of course, if the tinctures are labelled with the kind of ginger from which made—and there can be no objection to this—there should be no confusion in the public mind.

SOME ANOMALOUS TENSIONS

David Wilbur Horn, Ph.D.

THE RESULTS of recent measurements² by the writer upon the superficial tensions of aqueous solutions of soaps,³ tannin,⁴ extract of licorice,⁵ and saponin⁶ are given in Table I. These measurements were made in following up seemingly odd results obtained while examining a commercial soap solution sold for use in the mechanical distributing devices commonly placed in public wash-rooms.

Two points in particular call for remark: (1) the disproportionate effect of certain different minute quantities of soap as compared with the effect of notable quantities of soap; and (2) the existence of a minimum effect at intermediate concentrations of soap and tannin along with the absence of such minima in the cases of licorice and saponin. To illustrate the first point data may readily be drawn from the table showing that a unit weight of soap and a thousand unit weights of soap, when dissolved separately in equal volumes of water, are of equal effects in lowering the tension. The second point is readily brought out by plotting the data.

The experimental results upon soaps and tannin are not easy to interpret. As salts, soaps must be expected to raise (and not to lower) the superficial tension of water; the salts measured and

¹ Read before Delaware County Institute of Science, December 14, 1925.

² The soaps selected were the dry flake soap "Lux," and the cake soap "Fels-Naphtha." 10 per cent. solutions were made and kept throughout the measurements at the laboratory-incubator temperature, 37°C., and diluted with water at this same temperature as needed. At room-temperatures, the stronger solutions set to gels; the 0.5 per cent. solution ust gels; at room-temperature, in the case of the flake soap. The tension measurements were made as promptly as possible after dilution. At some concentrations the change of tension with time seemed more rapid than at others.

³ Measurements made with the duNouy apparatus, by which the force required to pull off a given platinum ring from the surface of each liquid is determined. See *J. Gen. Physiol.*, I, 5, May 20, 1919; *J. Exp. Med.*, XXXV., p. 575; p. 707.

⁴ A specimen of commercial "crystallized (?) tannic acid" was used. The solutions were made and measured at room-temperatures.

⁵ A pilular extract of known purity was supplied by the Department of Operative Pharmacy of the College. The solutions were measured at room-temperatures.

⁶ Dr. Arno Viehoveer, of the Department of Botany and Pharmacognosy of the College, supplied me with several grams of a purified saponin from *Yucca radiosa*. Cf. *J. Biol. Chem.*, XXVIII, p. 437, 1917; LII, p. 335, 1922. The solutions were measured at room-temperatures.

reported thus far in the literature⁷ have been found to raise the superficial tension. Further, Lenard has shown⁸ upon mathematical grounds that all non-volatile salts must be expected to act in this way. Therefore, soap does not behave normally as a salt.

TABLE I

Flake Soap		Cake Soap		Tannin		Licorice		Saponin	
Grams per 100 cc.	Dynes per cm.	Grams per 100 cc.	Dynes per cm.	Grams per 100 cc.	Dynes per cm.	Grams per 100 cc.	Dynes per cm.	Grams per 100 cc.	Dynes per cm.
10	34.3	10	34.8	61.5	58.8	20	47.5	10	51.0
7	33.7			30.7	48.8	5	47.5	1	52.0
5	33.7			7.7	41.6	2	47.5	0.2	53.5
3	31.9	3	34.6	3.1	45.7	0.2	54.0	0.1	54.7
1	30.3			0.31	59.0	$2 \times (10)^{-3}$	75.5	$2 \times (10)^{-2}$	61.0
0.5	30.2	0.5	31.5	$3.1 \times (10)^{-3}$	75.4	0	76.1	$1 \times (10)^{-3}$	63.0
0.4	29.6			0	75.6			$2 \times (10)^{-4}$	66.4
0.3	29.0	0.3	31.0					$4 \times (10)^{-5}$	75.4
0.2	28.2	0.2	30.3					0	76.1
0.1	28.9	0.1	30.9						
$5 \times (10)^{-2}$	28.7								
$2.5 \times (10)^{-2}$	28.9	$2.5 \times (10)^{-2}$	32.6						
$1 \times (10)^{-2}$	35.4	$1 \times (10)^{-2}$	37.8						
$5 \times (10)^{-3}$	39.0								
$2 \times (10)^{-3}$	41.0								
$1 \times (10)^{-3}$	41.0								
		$4 \times (10)^{-4}$	64.2						
		$1 \times (10)^{-4}$	73.5						
$1 \times (10)^{-5}$	44.2								
$1 \times (10)^{-8}$	53.1								
$1 \times (10)^{-11}$	73.2								
0	73.7								

NOTES.—In each series the same water was used throughout. In different series, different water from different raw water by different automatic stills was used because the experiments were not carried out in the same laboratory.

Taking the value for water at 73.7 dynes per cm., Dupré's figures yield 28.7 dynes at 0.08 gram Castile soap per 100 cc. and 28.5 dynes at 0.16 grams per 100 cc. For a different soap by a different method of measurement, this represents substantial agreement between my figures and Dupré's.

E. W. Woodward, loc. cit. footnote 6, found for saponin from *Agave lechuguilla* dissolved in Locke's solution 59.57 dynes at 0.01 gram per 100 cc., and 56.69 dynes for saponin from *Yuca filamentosa*. Considering the presence of the electrolytes in Locke's solution, and considering his use of a different method of measurement and a temperature of 37° C., this represents substantial agreement between my figures and Locke's.

⁷ Landolt-Bornstein, *Phys. Chem. Tabellen*, 5th ed., 1923. Vol. I, Tab. 62, p. 238 ff.

⁸ Probleme komplexer Moleküle, Sitzungsber. d. Heidelb. Akad. d. Wissensch., Jahrg. 1914, 27-29 Abhandl.

The slope of the curve setting forth the tension as a function of the concentration, ranges for soaps from $+0.5$ through zero to numerically great values such as -123000 . The corresponding values for salts are confined within the limits $+0.05$ to $+0.8$. Electrolytes known to exhibit negative slopes are volatile, for example HCl , HNO_3 , and NH_3OH ; the graph for H_2SO_4 is exceptional in that its slope passes from positive through zero to negative values, but the tension of all the solutions is greater than that of water. Lenard points out⁹ that at low concentrations H_2SO_4 is not volatile. These statements emphasize the unique behavior of soap as compared with other salts and electrolytes.

The extreme slope and the corresponding rapid reduction of the tension by soaps at concentrations from zero to about 0.2 per cent. can not be regarded as altogether surprising or unexpected in the light of the following prediction made upon thermodynamic reasoning by Willard Gibbs in 1878:¹⁰ "We may here notice the different action of traces in the homogeneous masses of those substances which increase the tension and of those which diminish it. When the volume-densities of a component are very small, its surface-density may have a considerable positive value, but can only have a very minute negative one. For the value when negative cannot exceed (numerically) the product of the greater volume-density by the thickness of the non-homogeneous film. Each of these quantities is exceedingly small. The surface-density when positive is of the same order of magnitude as the thickness of the non-homogeneous film, but is not necessarily small compared with other surface-densities because the volume-densities of the same substance in the adjacent masses are small. Now the potential of a substance which forms a very small part of a homogeneous mass certainly increases, and probably very rapidly, as the proportion of that component is increased. (See 171 and 217.) The pressure, temperature, and other potentials, will not be sensibly affected. (See 98.) But the effect on the tension of this increase in potential will be proportional to the surface-density, and will be to diminish the tension when the surface-density is positive. (See 508.) It is therefore quite possible that a very small trace of a substance in the homogeneous masses should

⁹ *Ibid.*, Teil III, p. 24.

¹⁰ Scientific Papers of J. Willard Gibbs, Vol. I, Thermodynamics, p. 274. Longmans, 1906. The bracketed numbers refer to equations for which the original paper should be consulted.

greatly diminish the tension, but not possible that such a trace should greatly increase it."

Experiments upon superficial tensions of soap solutions can be found in the literature. Gibbs cites work by Dupré¹¹ (1866) and by Duclaux¹² (1870), and there is more recent work by Botazzi and Victorow¹³ (1910). Dupré's results show clearly that in soap solutions in which the concentration of soap is successively *increased* the effect of different quantities of soap become nearly identical: "0.0008 et 0.0016 ont fourni des nombres presque égaux." Botazzi noted that in soap solutions when the concentration is successively *lowered* by the addition of water, "the surface tension of concentrated soap solutions is hardly affected by the addition of water." But apparently neither investigation was pushed throughout a wide range of concentrations. Dupré plotted his results in a way that shows that it was his view that the low values reached would continue practically unchanged upon further additions of soap. Duclaux worked throughout a wider range of concentrations but his figures are not correct, for he did not observe the phenomenon clearly indicated when Dupré's and Botazzi's findings are considered together. It was this phenomenon of minimum effect at intermediate concentrations that was evident in my results upon the commercial soap solution referred to in the first paragraph, and that led to the further results given in Table I.

Since increasing quantities of soap added to water at first decrease the tension to a minimum and then steadily raise it again above this minimum value, it might well be thought that the numerical result of each tension measurement is proportional to the resultant (or algebraic sum) of two opposing processes going on in the solutions as concentration advances. McBain's extensive experiments (1908 to 1920) upon soaps (which however do not include studies of superficial tensions) have led him to a point of view that is the most suggestive available as well as by far the most authoritative to date; his work is too exhaustive and his reasoning too carefully checked by skillful experimentation for his views to be dismissed lightly. According to McBain,¹⁴ soaps are neither electrolytes or

¹¹ Ann. de Chim. et de Phys., ser. 4, VII, p. 409; IX, p. 379.

¹² *Ibid.*, XXI, p. 427.

¹³ Atti. accad. Lincei, I, p. 659; by *Chemical Abstracts*, 1911, p. 1202.

¹⁴ McBain and Salmon, *J. Amer. Chem. Soc.*, 42, p. 426, 1920.

colloids but belong to a hitherto unrecognized class that he has named Colloidal Electrolytes. "Colloidal electrolytes are salts in which an ion has been replaced by a heavily hydrated polyvalent micelle that carries an equivalent sum-total of electrical charges and conducts electricity just as well or even better than the simple ion it replaces. . . . This class will probably prove to include, under certain circumstances, most organic substances containing more than 8 carbon atoms capable of splitting off an ion of any kind, such as acid and alkali proteins, soaps, etc. Indeed it is probable that this new class contains as many members as all acids and bases put together. In a measure the properties of this ionic micelle must apply to all colloids which possess even slight electrical charges. In the cases of proteins and soaps at high concentration, the undissociated substance is an ordinary colloid while the organic ion is a micelle. In dilute soap solutions, on the other hand, the undissociated molecules possess only the simple stoichiometric weight and the ions too are simple."

McBain's experimental method was such that he did not extend his measurements (of rise of boiling point) below 0.2 N., *i. e.*, between 5.5 and 6.5 per cent. solutions of soap. But within these limits "as the solutions become more dilute a gradual transition from colloid to crystalloid takes place, until in dilute solutions the soap is essentially an electrolyte just like potassium acetate. This refers to the undissociated colloid as well as to the colloidal ion or ionic micelle. In every solution again there is established a perfectly definite, completely reproducible equilibrium between all these constituents, both colloids and crystalloids."

The minimum demonstrated in my experiments may therefore be regarded as the point at which the algebraic sum of the following two opposing effects just equals zero, namely, the negative effect due jointly to the organic ion (micelle) and the undissociated colloid, and the positive effect due jointly to the electrolyte consisting of simple ions and undissociated molecules possessing only the simple stoichiometric weight.

Another example of behavior similar to that of soap was found in the case of tannin acid, which was taken as an example of an "organic substance containing more than 8 carbon atoms capable of splitting off an ion."

Glycyrrhizin is a glucoside that gelatinizes upon cooling after solution in boiling water, and that from the descriptions is apparently

not ionized. Saponin is also a glucoside; it gives a neutral reaction with litmus. Both glycyrrhizin and saponin are therefore unlike the glucodepside tannin, which in aqueous solution is acid to litmus and therefore considerably ionized. All three substances resemble soap in their ability to produce stable foams.

MEDICAL AND PHARMACEUTICAL NOTES

BUREAU OF CHEMISTRY TO STUDY METHODS OF ANALYSIS FOR DRUGS MORE INTENSIVELY.—“Systematic research in methods for the analysis of drugs has been established recently on a more extensive scale in the Bureau of Chemistry of the United States Department of Agriculture,” according to a recent announcement by officials of that bureau. “Work of this kind has been carried on in the Bureau of Chemistry for many years, but it has now been taken up in a more intensive way in order that reliable methods for the analysis of drugs may be made more readily available to pharmaceutical chemists and laboratories interested in this important subject.”

The work will consist largely in the critical revision of methods used in the analysis of drugs, including the identification and separation of potent medicinal substances in mixtures. It is proposed to try out new methods for the analysis of drug products, or those of uncertain status, by carefully controlled collaborative studies. Older methods will be critically reviewed and revised if necessary. Criticisms of unreliable methods will be published in the chemical and pharmaceutical journals. Unless known by long experience to be reliable, no method will be accepted until it has been subjected to trial under the most exacting conditions and to collaborative study with preparations of known composition. Acceptable methods will be embodied in monographs and published from time to time for distribution to those interested in the analysis or examination of drugs.

It is hoped by the officials that the aid of universities, colleges of pharmacy, and laboratories of pharmaceutical manufacturers as well as those of State and city drug officials may be enlisted to co-operate in this work by an exchange of information. It is especially desired to have the active co-operation of all pharmaceutical chemists and pharmaceutical laboratories. The progress and success of this

undertaking will depend in some degree on the freedom and extent of the co-operation and collaboration given by such agencies as mentioned. Provision will be made for prompt distribution of information and data to those who are particularly interested.

Mr. L. E. Warren, who for a number of years has been associate chemist of the American Medical Association in Chicago, has been appointed to have immediate charge of this work. Mr. Warren is a graduate of the School of Pharmacy of the University of Michigan, and has had considerable experience in the manufacture and control of medicinal chemicals and pharmaceuticals, as well as many years of experience in the analysis and standardization of medicines. He was formerly employed as a drug analyst in the Bureau of Chemistry.

Many analysts and a large number of agencies, such as pharmacopœial revision committees, Government laboratories and the laboratories of pharmaceutical manufacturers, and schools of pharmacy are conducting all over the world researches in the chemistry of drugs. In this way a very extensive literature has accumulated. However, the methods are widely scattered in the literature in several languages and some of them are misleading and unreliable. Search of the literature often reveals several methods for the analysis of a medicinal substance, yet the analyst may have no way of determining which procedure is the most trustworthy without subjecting them all to trial. Sometimes no method applicable to the problem in hand can be found. Several books on the analysis of drugs and medicines have been published, but at present there is no comprehensive treatise in which the information in the literature has been brought together, critically examined, and co-ordinated for use.

NEW GLAND EXTRACT HEALS BROKEN BONES.—Broken bones can be cured through the use of a new glandular extract that has already proved its usefulness in curing tetanus.

This is the information reaching here from Japan where experiments have been in progress with the hormone of the parathyroids that was isolated last year by Prof. J. B. Collip, of the University of Alberta, Edmonton, Canada.

Professor Collip obtained from the parathyroid glands a hormone or extract which, when injected or given by the mouth, causes the amounts both of calcium and phosphate in the blood serum to rise. The parathyroids are small glands in the neck which lie near the

thyroid gland or are embedded in it. His discovery was applied successfully to the cure of tetany, a somewhat rare disease usually found in children, and characterized by peculiar spasms.

A much wider utility for it is foreshadowed by the work done subsequently by Dr. Ogawa, in the surgical clinic of the Japanese medical academy of Keijo. As bone is so largely composed of calcium phosphate, a hormone which raises the amount of this substance in the blood might be expected to assist in bone formation. Rats with broken legs were found to produce twice as much new bone when fed with parathyroid glands as when not so fed.

Bone consists largely of calcium phosphate, and after a fracture fresh quantities of this substance must be taken from the blood for the formation of new bone. The slowness of the healing process seems to be largely due to the very small amounts of calcium and phosphorous in the blood.

The publication of the results in the case of human beings is awaited with the greatest interest, for there is reason to believe that the administration of parathyroid extract would not only hasten the healing of fractures in the young, but might render it possible in old age.

PROPYLENE AS ANÆSTHETIC.—Propylene, one of the constituents of illuminating gas, is being used as an anesthetic in connection with major operations in hospitals. Dr. J. T. Halsey, of Tulane University, reports satisfactory results.

This is a new step in the use of ingredients of common illuminating gas for anesthetic purposes. Ethylene and acetylene, which belong to the same chemical family tree as propylene, is already extensively used by dentists and in clinics and hospitals. But propylene is more than twice as potent, so that more oxygen can be administered with it, thus minimizing danger to the patient's breathing.

Butylene and amylene, two other members of the same family, are still more powerful, amylene having fifteen times the strength of ethylene. These two, however, are impractical for hospital use because they arouse marked nervous symptoms, which are not noted in reactions to the weaker gases.

CANCER INCREASE DECLARED REAL.—A careful analysis of cancer statistics gathered by the U. S. Census Bureau over a period

of about twenty years in ten Eastern states reveals definitely that cancer mortality is from 25 to 30 per cent. higher than it was about twenty years ago. This is the claim of Dr. J. W. Schereschewsky, of the U. S. Public Health Service, who made the statistical analysis and reported it to the American Medical Association.

"There has been a pronounced increase in the observed death rate from cancer in persons 40 years old and over in the ten states comprising the original death registration area," Dr. Schereschewsky said. "Part of this increase is due to greater precision and accuracy in the filling out of death returns, but the remainder is an actual increase in the mortality of the disease."

POLLEN ANALYSIS HOLDS HOPE FOR HAY FEVER VICTIMS.—Just when the hay fever battle of 1925 is over, and the last echoes of three billion sneezes have faded out of the air, comes news that may enable hay fever fighters to attack the enemy at somewhat closer range in the next encounter. The new trench that has been taken is analysis of grass pollens that cause hay fever, in order to isolate protein substances in the grass.

This is the third step in conquest of hay fever by pollen treatment. Back in 1865, Dr. Blackley, an Englishman, proved that the malady was caused by pollen of certain plants. In 1902, German investigators showed that the protein is the part of the pollen grains which has power to poison individuals, causing the result that we know as hay fever symptoms.

Now three distinct protein substances have been isolated from timothy and orchard grass pollen, and the power of these chemically pure substances to cause hay fever symptoms has been tested. Results of this work are reported by Drs. D. B. Jones and F. A. Csonka, of the United States Protein Laboratory, and Dr. H. S. Bernton, associate professor of hygiene and preventive medicine, at Georgetown University.

In their tests the three investigators found that all hay fever sufferers who had the summer type of hay fever caused by timothy and other grasses were affected by the first of the isolated substances, protein A. Fifty per cent. of the hay fever victims were also sensitive to protein B, the second substance. Protein C was negligible. No one was affected by it in the experiments.

Dr. Bernton states that he believes these findings may lead to progress in pollen treatment of hay fever. "Instead of immunizing patients by injecting pollen extract, we may be able to give them directly suitable doses of the different proteins, and immunize them in that way," he says. "Investigators have had from five to sixteen per cent. of failures in treating subjects with pollen, and I believe that some of these failures at least are due to the fact that patients are sensitive to both A and B proteins and do not get enough of protein B, which is present in much smaller quantities than protein A in the hay fever pollens which we have tested."

BLOOD PRESSURE REDUCING COMPOUND FOUND IN LIVER.—High blood pressure is reduced by substances produced in the liver, and extracted as a highly concentrated and potent compound by a Canadian physician, Dr. W. M. MacDonald, of St. Catharine, Ontario. Recently Dr. MacDonald discovered the value of a cruder form of the extract, and made a preliminary announcement of the fact. Since then he has been working on methods of purification and refinement, and made his report here before a recent meeting of the Toronto Academy of Medicine.

The results which have been obtained in experimental animals with the liver extract, and preliminary chemical analysis of the potent material, have shown that the active principle is similar in character and action to certain ammonia-like substances already known to be capable of lowering the blood pressure. The great differences between the new material and the old lie in the size of the necessary dose and in the duration of the effects. To produce a given diminution of pressure, incomparably smaller quantities of the new material are needed than of histamine or chlorine, two of the most active of the older chemicals.

Further, the liver extracts produce effects which persist for several hours. All preparations which had been tried before Dr. MacDonald drew attention to liver extract had only a temporary effect and therefore gave little promise of furnishing a weapon for attacking the ailment in human beings.

The facts in connection with this new remedy as they are known to date were summarized by Dr. MacDonald as follows:

"An extract of liver has been obtained which possesses the property of reducing to a certain extent arterial hypertension in cases where there are no complications.

"This extract contains neither protein nor peptone, but does contain histamine in small quantities. It contains choline in relatively large quantities.

"It is quite possible that the effect produced by a proper combination of these two substances may be responsible for the lowering of pressures noted in both laboratory animal and clinical cases.

"It is more probable, however, that because of the much greater effect produced by a given quantity of extract, than can possibly be obtained by the injection of even many times the quantity of histamine and choline contained in the said quantity of extract, the result is due to an unknown substance, or that this unknown substance may activate either the histamine or the choline or both.

"Intramuscular injection is much more efficacious than intravenous. The extract is more effective in hypertension than in normal cases."

Stating that much yet remains to be discovered, Dr. MacDonald said: "Whereas our method of assaying the extract in units is definite, we have as yet no method of determining the dosage, in units, for any given case. Neither have we any method of determining our selection of cases for treatment."—*Science Service*.

NEWS ITEMS AND PERSONAL NOTES

DR. EUGENE G. EBERLE HONOR GUEST AT DINNER.—Dr. Eberle, a familiar figure in Philadelphia as well as in national drug circles, and Editor of the *Journal of the American Pharmaceutical Association*, as noted elsewhere in this JOURNAL, has removed to Baltimore, where the headquarters of the association are temporarily situated.

Ever since Dr. Eberle came to Philadelphia some time ago from his beloved Texas, each year that passed increased his host of friends here, as everywhere, and bound him firmer in the affections of all his intimates.

It is not strange, then, that there was keen regret when Philadelphians learned of the proposed change, which would rob them of his companionship.

To show their respect for him, to let him know of their love for him, to send him happier on his way—there gathered in the Bellevue-Stratford Hotel evening of December 28, a large group of his Philadelphia friends and admirers. Friends also came from other cities.

The toastmaster was Joseph W. England who functioned with his characteristic dignity and grace.

After the dinner, and chiefly due to the consummate management of the toastmaster, twelve speakers were miraculously timed, so that between them they consumed exactly one hour. Just how the toastmaster managed it no one seems to know—for Houdini never concealed his tricks with so much finesse.

Anyway, it was a master stroke and never was after-dinner speechmaking any better received—for it was not the even dozen that friends came to listen to—it was Dr. Eberle they wanted to hear.

Now Dr. Eberle, functions better in an editorium than in an auditorium. That is his own remark.

Yet, those who listened to his happy speech when there was tendered to him, as a token of the esteem in which his friends from Philadelphia hold him, a two-way travelling bag, and a one-way collapsible (sic!) umbrella—will never forget the ring of sincerity—the touch of honest affection—and the charming modesty with which he clothed his paragraphs.

So that formal record is made of the splendid affair there is appended a list of the speakers and their timed and timely topics:

"A Student of the P. C. P.," by Dean Charles H. LaWall.

"The Class of 1884" (Dr. Eberle's Class), by William L. Cliffe.

"Member of the A. Ph. A.," by George M. Beringer.

"Member of Committee of Revision of U. S. P.," by Chairman E. Fullerton Cook.

"Corresponding Secretary of the Alumni Association of P. C. P. & S.," by President W. Wilson McNeary.

"A Fellow Journalist," by Ivor Griffith.

"The Guest of the Philadelphia Drug Exchange," by Walter V. Smith.

"His New Home," by Dr. E. F. Kelly, Baltimore, Md.

"The Philadelphia Branch, A. Ph. A.," by President Mortimer M. Smith.

"The N. A. R. D.," by ex-President Ambrose Hunsberger.

"The P. A. R. D.," by Otto Kraus.

"The Medical Profession of Philadelphia," by Dr. William Duffield Robinson.

With Dr. Eberle, to Baltimore, go the honest regards and best wishes of his Philadelphia friends—whose ill-fortune at losing him is the good fortune of Baltimore drug circles. One who has had in Philadelphia the privilege of finding him always at his work, but ever ready to help, morning, noon, or night—will be glad to still have the pleasure of receiving from Baltimore, an occasional letter that will end as usual—"Always glad to be of service."

COLLEGE NEWS

The plan of dividing up the freshman class into groups, each of which is placed under the guidance of a faculty adviser has been instituted this year for the first time. This is for the particular purpose of helping those who become easily discouraged and for the purpose of improving scholarship by giving individual instruction whenever needed.

On Friday evening, November 9th, thirty members of the faculty and instructional corps of the Philadelphia College of Pharmacy and Science held a faculty meeting and dinner at the Hotel Longacre. Professor Ryan of Swarthmore College, was the speaker of the evening, which was devoted to a discussion mainly of pedagogic questions and the application of the honors system of collegiate work in which those of marked scholaristic ability are released from all compulsory class attendance, but held accountable for very severe examinations at the end of the course.

On the night before Hallowe'en the faculty members gave a party for the Freshman Ph. G. class. More than 300 were in attendance, and participated in games and dancing. There were doughnut eating contests, apple eating competitions, fortune telling, and many other amusements.

On Tuesday evening, November 24th, a reception and dance was tendered to the senior Ph. G. class by the members of the faculty of the Philadelphia College of Pharmacy and Science. The evening was enlivened by elimination dances, Paul Jones dances and other novelties. The music was furnished by a group of woman musicians whose services are in great demand for such occasions.

A Christmas party was given on Friday evening, December 18th by the members of the faculty of the Philadelphia College of Pharmacy and Science to the bachelor of science and graduate course students of the college. The wives of the faculty members procured a Christmas tree and greens and decorated the auditorium beautifully and appropriately. Music was furnished by Belov's Orchestra. There were more than 100 in attendance. One feature of the party was the entrance of Santa Claus who presented a gift to each guest. Dancing was indulged in by many, and as an appropriate finale, the lights were dimmed and Christmas carols were sung.

The basketball team of the Philadelphia College of Pharmacy and Science is well organized and is being coached by Harry Knorr, a professional employed for the purpose. They have not struck a winning gait as yet, but better results are expected after the Christmas holidays.

The Philadelphia College of Pharmacy and Science boasts of two well-organized orchestras this year, both of which are being trained by a professional musician, a former graduate, Mr. Belov.

The dance orchestra includes: Weadley, piano; Devizia, violin; Burns, saxophone; Altman, saxophone and small trumpet; Burr, trombone, and Weidner, traps.

The concert orchestra consists of: Miss Korman, piano; Popkave and Eshmer, first violins; Idzak and Pyle, second violins; Miss Cosgrove, 'cello; Verato, clarinet.

The concert orchestra made its debut at a recent assembly. Both orchestras will probably be in great demand later in the year.

Among those who have thus far addressed the student assemblies which are held each Wednesday morning in the auditorium are Pro-

fessor LaWall and Howard Kirk, Esq., of the faculty; Dr. E. L. Swan, Dr. A. L. Pohlman and Colonel S. P. Wetherill, Jr.

The Senior Promenade and Dance of the Philadelphia College of Pharmacy and Science was held on Wednesday evening, December 16th, in the ballroom of the New Elks Building on Broad Street. About 500 were in attendance as the seniors had invited the freshmen as their guests.

The officers of the first year class are as follows: President, C. F. Kropp, of Plains, Pa.; vice-president, T. E. Blandford, of Edwardsville, Pa.; secretary, Miss Mary Cosgrove, of Philadelphia, Pa.; executive committee, Evans, Harris, Altman, Hoover, Tibbetts; treasurer, H. A. Cooke, Germantown, Pa.

The officers of the senior year class are as follows: President, George Bennett, of Harrisburg, Pa.; vice-president, L. M. Middleton, of Philadelphia, Pa.; secretary, Miss Dorothy Whalen, Mahanoy City, Pa.; treasurer, Charles J. Paul, Jersey Shore, Pa.; executive committee, Charles Morgan, Donald Everitt, Miss Elizabeth McCormick, Miss Lois Lansberry, Florentine Donato.

The Pharmascope, the college students' magazine issued weekly in mimeographed form during the spring of 1925, has reappeared under the sponsorship of the seniors, as a monthly. It will probably be issued more frequently later in the year.

JOURNAL OF A. PH. A. NOW LOCATED IN BALTIMORE.—After December 31, 1925, the secretarial offices of the American Pharmaceutical Association and of the *Journal*, A. Ph. A., will be located in the Long Building, 10 West Chase Street., Baltimore. All mail for the American Pharmaceutical Association, for Secretary E. F. Kelly, for the *Journal*, A. Ph. A., and for Editor E. G. Eberle, should be addressed as above.

The Headquarters Building Campaign Committee is located immediately opposite the new association offices.

Combination of the offices, which have heretofore been located in different cities, is a preparation for the greater service to be promoted by the American Pharmaceutical Association through the headquarters.

ANTIBODY REDUCES PNEUMONIA DEATH RATE.—The thermal reactions which frequently followed intravenous injections of Pneumococcus Antibody Solution in the early tests made with this product have now been largely eliminated, so the manufacturers report. This has been accomplished by modifications and improvements in the process of manufacture, so that the end product is a more highly refined solution.

Pneumococcus Antibody Solution is described as a clear, colorless, aqueous solution, containing antibodies obtained from potent Antipneumococcic Serum. The fact that it is serum-free and, therefore, cannot produce serum sickness or cause anaphylaxis is especially emphasized.

This product has a rather unusual history, in that Pneumococcus Antibody Solution had been used clinically on hundreds of cases, and the results reported in leading medical journals, before a single package was offered for sale.

The results obtained in those tests were very striking and showed that, among lobar pneumonia patients receiving antibody during the first three days of the disease, the death rate was only 13 per cent., as compared with a 26 per cent. death rate in the control group—those who received no antibody. In other words, the antibody cut the death rate in half.

Since there occur, conservatively, 140,000 deaths from pneumonia in this country each year, a product which has shown such fine results in reducing the death rate promptly assumes great importance. Hence, it is suggested to readers who are interested in learning more about Pneumococcus Antibody Solution, that they write to the H. K. Mulford Company, Mulford Building, Philadelphia, Pa., in whose laboratories this product was originated and developed. Ask for a copy of Mulford Bulletin No. 26, which has just been issued.

IODEIKON—A NEW X-RAY DIAGNOSTIC AGENT.—There is much discussion these days in the medical profession regarding Iodeikon and what it is used for. A circular received at our office discloses the fact that it is a copyrighted name of the Mallinckrodt Chemical Works for a chemical compound they manufacture, known as Tetraiodophenolphthalein Sodium. It is used for X-ray examination of the gall bladder, a method discovered by Prof. E. A. Graham, of the Washington University Medical School. It has been exhaustively

discussed in the *Journal of the American Medical Association*, *Annals of Surgery*, *American Journal of Roentgenology*, and other publications, and is regarded as being one of the most important contributions to medical science that has been made for some time.

The Mallinckrodt Chemical Works will supply any physician or druggist with literature or information regarding the preparation.

BOOK REVIEWS

HANDBUCH DER BIOLOGISCHEN ARBEITSMETHODEN. Division 4, part 7, fasciculus 6. 8vo. 185 pages. Urban & Schwarzenberg. Berlin and Vienna. 7.50 marks.

This is a fasciculus of the extensive and thorough treatise under the charge of Dr. Aberhalden assisted by a large number of specialists. The work is so well and favorably known to chemists, biochemists and physiologists throughout the world, that little is needed except to announce the publication of the issue before us. It comprises two very different topics: an essay on the pharmacology of warm-blooded animals after operations on the spinal cord, and a treatise on methods of analysis of secret preparations. The first essay concerns exclusively the pharmacologist and worker in experimental therapeutics. This contribution is by W. Storm Van Leewen, of Leyden. The essay on the analysis of secret remedies, which is opportune and is very extensive, is by K. H. Bauer, of Stuttgart. The analysis of the many secret remedies which are now offered is perhaps the most difficult task offered to the chemist. Dr. Bauer naturally refers to this in the introductory note. Notwithstanding the investigations that have been made and the importance of the procedures, the definite and complete analysis of such preparations is still far from established. The makers and purveyors of them find so much profit in their respective fields that they can afford to avail themselves of scientific information as well as utilize the now well-developed psychology of advertising and thus defy the methods of the laboratory. There is perhaps no better equipped laboratory for the systematic analysis of such preparations than that operated under the auspices of the American Medical Association, yet its reports are frequently incomplete owing to the present impossibility of positively identifying many

animal and vegetable proximate principles. Dr. Bauer's contribution will be of assistance in such work, but much remains to be done. It is noticeable that Dr. Bauer's references are almost exclusively to German literature.

H. L.

A TEXT BOOK OF PHYSIOLOGY. By Wm. D. Zoethout, Ph. D., Professor of Physiology in the Chicago College of Dental Surgery, Loyola University, and in the Chicago Normal School of Physiological Education. Second Edition. C. V. Mosby Co., St. Louis. 616 pages.

The preface of this book opens with the statement that it "is intended to fill the gap between the larger texts, of which there are many in the field, and those offering a briefer course." The fulfillment of such a purpose requires a nicety of judgment as to what details may safely be omitted and a genius for clarity of expression in condensed form. As the book is intended for students in Dental, Pharmacy and Normal Schools, it is necessary to include some histological information which does not strictly belong to the subject of physiology. Such a concatenation of conditions makes a peculiarly difficult task for the author. While there is much that is commendable in the book we do not feel that Professor Zoethout has altogether succeeded in the purpose he has set for himself. In some places the book goes into the subject with such a wealth of detail as to be difficultly comprehensible by students who have not had considerable previous training in medical thought, while other subjects, of considerable importance, are dismissed with such brief descriptions as to be of little service. The chapter on Nerve-Muscle Physiology covers forty-nine pages while the description of the Autonomic Nervous System—which governs all our vital organs—is given two and a half pages in the back part of the book. Under the subject of the Central Nervous System six pages are devoted to a consideration of the effects of alcohol on the psychic activity; this subject, which while of much interest, seems to us to belong to text books of Pharmacology rather than Physiology. Another unfortunate feature is the complexity of the index. For example—"Alcohol, Physiological Effects of" has ten page number; "Bacteria" has nine page numbers; "Carbon Dioxide" is listed in twelve places; "Mind, Effect of, on Bodily Functions" has eleven page numbers; "Muscle Work,

Effect of, on Bodily Functions" is assigned seventeen references; and many other titles in from three to seven places. When the reader starts investigating these references he finds that in most of the places there is merely a passing mention of the subject, but in no way does the index show which of the pages referred to contains important information.

Among the commendable features of the book is the interesting tendency of the author to wander into philosophical bypaths, in the course of which he discovers much interesting if not important information. The illustrations are numerous (186) and mostly well selected.

H. C. WOOD.

THE CHEMISTRY OF DRUGS. By Norman Evers, B. Sc., F. I. C., London, England, 247 pages. Price \$9.00. Published by D. Van Nostrand Company, 8 Warren Street, New York.

The author has chosen a most comprehensive title for his work. He has spared no effort in making his book worthy of the title. It is a master treatment of medicinal substances from the standpoint of pure chemistry. The book is chiefly concerned with chemical constitution and reactions, and, with the chemistry of the methods of manufacture of drugs obtained from natural sources or prepared of chemical synthesis.

Drugs of natural origin, whose active principles are unknown, or from which no definite compounds of known constitution have been isolated, have been omitted or lightly touched on.

In describing methods of manufacture more stress is laid on the chemistry of the methods employed rather than of technical details or of details of plant. It is notorious that authors of textbooks do not describe methods of manufacture actually in use, or they omit the really important details of a process, because otherwise they would be giving away secrets of commercial value. However justified this criticism may be, it is felt that this book will be of more value to the student if manufacturing methods are regarded rather from the chemical than from the technical point of view. Methods of analysis have been excluded entirely. The analysis of drugs is matter sufficient for a textbook in itself, and is best treated as a separate branch of the subject.

The subject of essential oils used in medicine has been only cursorily treated, since it is fully dealt with in another book in this Van Nostrand series, "The Chemistry of Essential Oils," by H. Finne-
more.

A book of this type "may be judged by the kind of" *bibliography* "it keeps." Throughout this text one is impressed by the recentness of the authorities quoted. Furthermore, these references are conveniently scattered throughout the text, even though the multiplication of them consumes the typesetter's variety of symbols.

Despite the fact that this volume is by a British author and largely based upon British medicaments its scope is decidedly international. This reviewer does not know of any similar work which is so modern, so exact and so complete in its treatment of the individual drug. Favorable comment is made in the arrangement of text on the excellence of printing and binding, and the completeness of the index. It is a book that is eminently worthy of an important place in the consulting library of pharmacists, physicians and chemists.

IVOR GRIFFITH.